MODERN PLASTICS

SEPTEMBER 1947

★ *New Pages from the* **DUREZ** *Diary*

● To the casual observer, everything looked fine for synthetic rubber when tires began to set mileage records.

But elsewhere there was trouble. The successful use of synthetics in producing the much-needed hard and semi-hard rubber stocks was baffling the industry's technicians. Tree rubber, with its high natural plasticity, was easy to mill with added carbon black and other materials. Until recently, however, the peculiar stiffness of synthetic rubber made it very difficult to "load" these stocks sufficiently.

So Durez engineers joined the search, bringing in twenty-six years of specialized experience with the phenolic plastics. Out of this collaboration came Durez thermosetting phenolic resins with the very useful ability to *soften* synthetic rubber in milling.

The Durez resins, being completely compatible with synthetic rubber, also *reinforce* it. Resultant stocks possess great tensile strength, a high degree of hardness, excellent elongation, improved abrasion resistance, and flexibility at low temperatures.

Broad new fields of utility have been opened to the synthetic rubbers through formulation with Durez resins. Synthetic rubber propeller de-icer rings are light in weight, yet resist fracture. Synthetic shoe soles are stiffer and harder, and wear longer. Synthetic handles on screw drivers and other tools prevent electrical shock. Other important applications are now in process.

Send for new folder "Durez Resins for the Rubber Industry."

Durez Plastics & Chemicals, Inc., 59 Walck Road, North Tonawanda, N. Y.

PHENOLIC RESINS

- MOLDING COMPOUNDS
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS

PHENOLIC RESINS THAT FIT THE JOB

ALL IS NOT GOLD THAT GLITTERS...MUCH IS *Catalin*

In the field of quality costume jewelry, imaginative minds are ever at work . . . conceiving smart designs, combining alluring colors, developing new effects . . . and adding immeasurably to the acceptance of their creations through the use of Catalin — the gem of plastics.

Because fashions change frequently, timeliness is of the utmost importance in producing costume jewelry. One of the many advantages of gem-like Catalin is, that new styles can be economically fabricated at a moments notice from stock sheets, rods, tubes and an almost limitless assortment of suitable shapes. The rich, deep, lustrous colors of Catalin Cast Resins make them fit perfectly into our ever-changing tempo of modern living. Catalin is equally effective used alone or when harmoniously combined with other materials.

On the quality mart, Suray, is currently exciting the feminine pulse with lightweight, exquisite flatteries in carved, engraved and partially gold plated Catalin earrings, bracelets, pins, cigarette holders. As indicated in the illustration, the technique involves both machine and handwork . . . the former, keeping costs down . . . the latter, imparting costume individuality — so essential in quality selling.

Whether fabricated from stock shapes or cast to customer specifications, the use of Catalin offers greater design flexibility — low *tooling up* costs.

For the touch that is one of incomparable beauty, investigate Catalin for your next product projection. Our service staff will welcome the pleasure of assisting you. Inquiries invited!

CATALIN CORPORATION OF AMERICA

ONE PARK AVENUE • NEW YORK 16, N. Y.

Catalin costume jewelry by Suray, 115 W. 52nd St., New York 19, N. Y.

CATALIN

THE GEM OF PLASTICS

Catalin

CAST RESINS • LIQUID RESINS • MOLDING COMPOUNDS

MODERN PLASTICS

VOLUME 25 SEPTEMBER 1947 NUMBER 1

CONTENTS

"EXECUTIVE and EDITORIAL OFFICE: 122 E. 42nd St., New York 17, N. Y. Published the 20th of preceding month by Modern Plastics, Inc., at Publication Office: Twentieth and Northampton Sts., Easton, Pa. Entered as second class matter, May 28, 1940, at the Post Office at Easton, Pa., under the act of March 3, 1879."

Subscription $5.00 a year, $8.00 for two years in U. S., its possessions and South America. Canadian subscriptions $5.50 per year. All other countries $6.00 per year, payable in New York funds.

Cabin in the sky.. 1947 style

Some more interesting applications for GEON polyvinyl resins

YOU'RE looking inside the new DC-6 in that picture. And you're seeing a few of the yards and yards of wall trim and floor covering—made from GEON polyvinyl resins—that are going into these huge new commercial planes.

Like so many products made from GEON, these were selected because they have exactly the right properties in exactly the right combination.

For example, these flexible materials are light weight, an important consideration in any aviation product. Yet they are extremely tough—resist wear and abrasion. They have high resistance to flame, heat, cold, aging, sunlight, water, foods, chemicals, and most other normally destructive factors. They can be made in brilliant or delicate colors. And they can quickly be washed clean with soap and water.

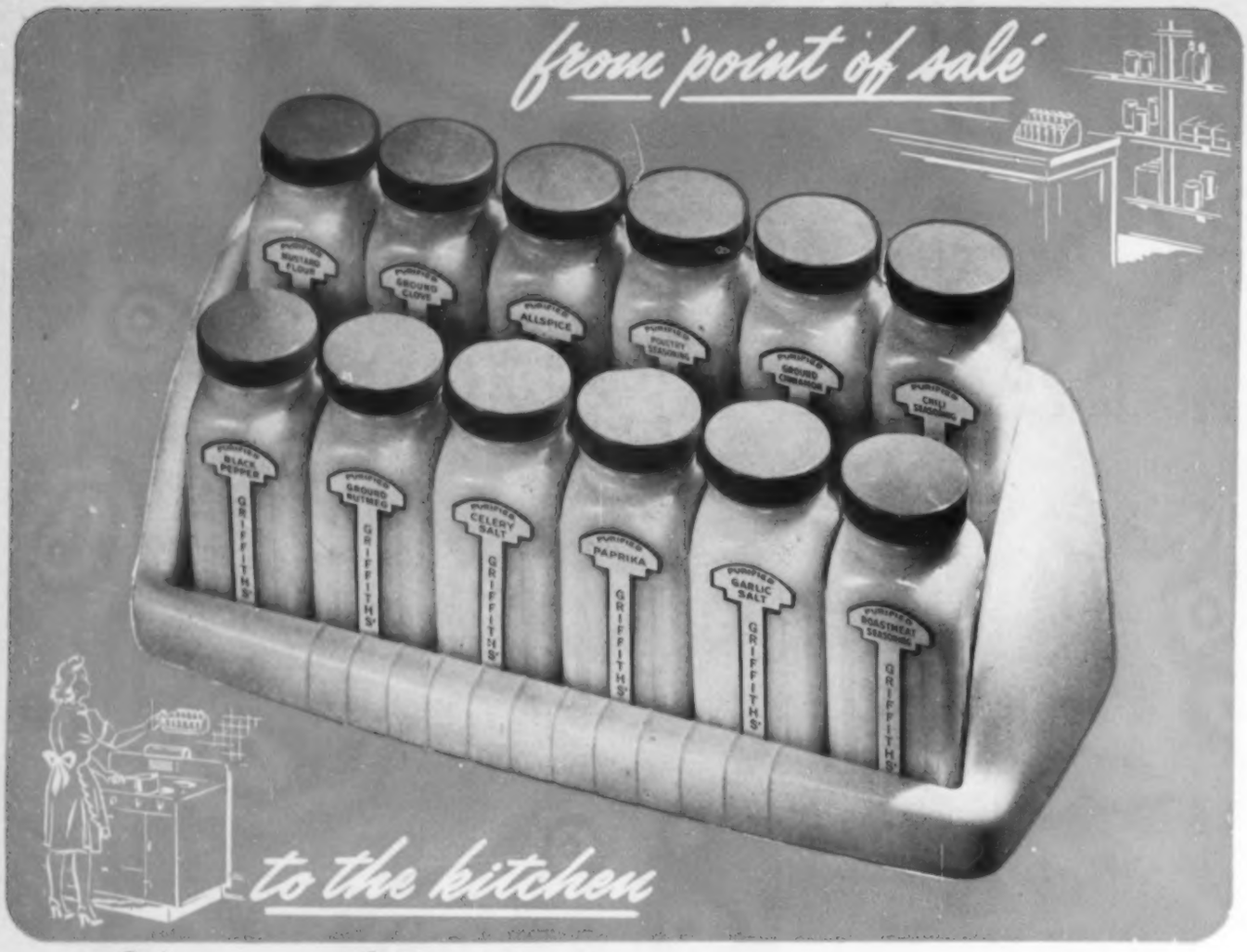
GEON resins may be pressure or injection molded, extruded, calendered or cast into sheet or film. In solution, latex, or paste forms they may be used as coatings for fabrics, fibres, and papers. The variety of end products is literally limitless.

We make no finished products from GEON or from other raw materials manufactured by B. F. Goodrich Chemical Company. However, we'll be glad to work with you on any special problems or applications in connection with GEON polyvinyl resins, HYCAR American rubber, KRISTON thermosetting resins or GOOD-RITE chemicals. For more information please write Dept. **O-9**, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • KRISTON thermosetting resins • GOOD-RITE chemicals



Chicago Molded PLASTICS

ADD SPICE TO THE PRODUCT!

Spices are usually classed as staples . . . purchased singly . . . and seldom. But the Griffith Laboratories of Chicago felt that proper merchandising could take their product out of this class and thereby increase the demand.

They came to CMPC with their problem . . . and got the answer. It's shown above . . . a handsome spice set injection molded of polystyrene. This material, in glistening white or brilliant red, was selected not only for its eye-appeal but for its light weight, resistance to moisture, and dimensional stability. Combined with the white jars and colorful jar tops it gives Griffith every advantage in the consumer field. Acceptance by the trade has already proved that.

It's another good example of the ability of this organization to tackle most any molded plastics problem and come up with the right answer.

Perhaps you have a product that could benefit by this type of merchandising . . . by improving its consumer appeal and utility. But whatever your problem, if it involves the use of molded plastics, you'll find it worthwhile to discuss it with a CMPC Service Engineer. Your request incurs no obligation.

CHICAGO MOLDED PRODUCTS CORPORATION

1046 N. Kolmar Ave. Chicago 51, Illinois

Representatives in principal industrial centers

COMPRESSION AND INJECTION MOLDING OF ALL PLASTIC MATERIALS

EDITORIAL STAFF

Editor: CHARLES A. BRESKIN
Executive Editor: LAURA E. MORRISON
Technical Editor: DR. GORDON M. KLINE
Engineering Editor: FRED B. STANLEY
Features Editor: R. L. VAN BOSKIRK
Art Director: DONALD R. RUTHER
Midwestern Editor: VAL WRIGHT
Associate Editor: ANITA COMSTOCK
Assistant Editor: VIRGINIA SUE WILSON
London Editor: PAUL REILLY

Write READER'S SERVICE for plastics information

EXECUTIVE STAFF

Publisher: CHARLES A. BRESKIN
General Manager: ALAN S. COLE
Associate Publisher: HIRAM McCANN

BUSINESS STAFF

Advertising Manager: ALAN S. COLE

P. H. Backstrom
M. A. Olsen
J. M. Connors
R. C. Beggs
A. M. Rothenberg
Burton W. Gussow
Joseph A. Drucker
W. F. Kennedy

Promotion Manager: JOHN G. KASTEN
Production Manager: DANIEL M. BROADS
Ass't. Production Manager: B. J. FARINA

Executive and Editorial Offices:
122 E. 42nd St., New York 17, N. Y.
Tel., MUrray Hill 3-0655

Circulation Department
Circulation Manager: FREDERICK A. KLEIN
32 Broadway, New York 4, N. Y.
Tel., WHitehall 4-4782

Branch Offices
Chicago 1: 221 N. La Salle St.
Manager: J. M. Connors
Tel., Randolph 5588
Cleveland 14: 815 Superior Ave.
Manager: R. C. Beggs
Tel., Superior 0737
Los Angeles 5: 2412 W. 7th St.
Manager: A. M. Rothenberg
Tel., Fairfax 2978

Member Audit Bureau of Circulation
MODERN PLASTICS is regularly indexed in Industrial Arts Index and Industex.

A comeback

There are many signs to indicate that the squeeze on certain segments of the plastics industry is beginning to ease. There is an almost unanimous opinion that September business in thermoplastics will show an improvement over August. Guesses have been made that it will increase from 15 to 50 percent, though some wishful thinking would seem to be involved in the more optimistic estimates. Nevertheless, it is apparent that the trend has turned upward.

Though the squeeze from which the plastics industry has suffered was not pleasant from a dollars and cents viewpoint, it was not all evil. Most of the bulging inventories in processors' store rooms have now been depleted. Over-expansion in the processors' branch of the industry has been halted. Companies have been reorganized on a more closely knit plan and management is undoubtedly on a more expert basis than it was immediately after the war when confusion and chaos reigned supreme.

When supplies are short and customers are plentiful certain evils are bound to propagate. Probably the most pernicious is a temptation to use inferior materials, unskilled workmen and improper applications. The plastics industry suffered from this condition but, now the supply situation has eased, the processors giving way to this temptation are the exception. Industry members have rolled up their sleeves, dug in and started intelligent campaigns to put their house in order and go after business.

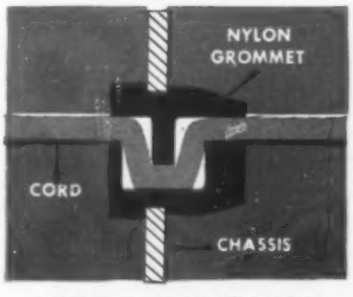
One of the first results has been the appearance of better designed and more perfectly constructed plastics articles. Manufacturers have learned that mere copying of other products is a poor way to progress. The benefits of originality are beginning to show. An example is the printed report of an observer who says that plastics toy manufacturers who have overcome competition have done so by correcting misuses and misapplications—they have reduced prices and now profit from some of the best moving items in the line, namely, miniatures such as dollhouse furniture and small vehicle models. The same reporter observes that small iron, zinc and rubber toys have been set back by the increased sale of plastics.

Press releases on new plastics applications are crossing the editor's desk in increasing quantities. They cover all classifications of the industry. Among the significant ones is the annoucement of cinder building bricks coated with a polyester resin and bottle caps coated with the same material to keep the bottler's brand name from rubbing off. There is plenty of evidence to indicate that the industry has gone after and found new markets.

Another blessing to arise from the blue fog of a sagging market has been the partial elimination of machine obsolescence. The plastics industry had been running night and day for five years with little time for repairs or check-ups. During this slack period old equipment has been thrown out or rebuilt, boilers have been repaired, baling wire and odd pieces of accouterment dispensed with. There has been time for technicians to give thought to improved methods. There is every reason to believe that management has had a chance to improve plant efficiency and make ready for an intense program of development and merchandising that will see this industry take its rightful place in the business world.

NYLON GROMMET WITH A VISE-LIKE GRIP

New safety for appliances . . . molded from a Du Pont plastic



HOW NEW GROMMET WORKS

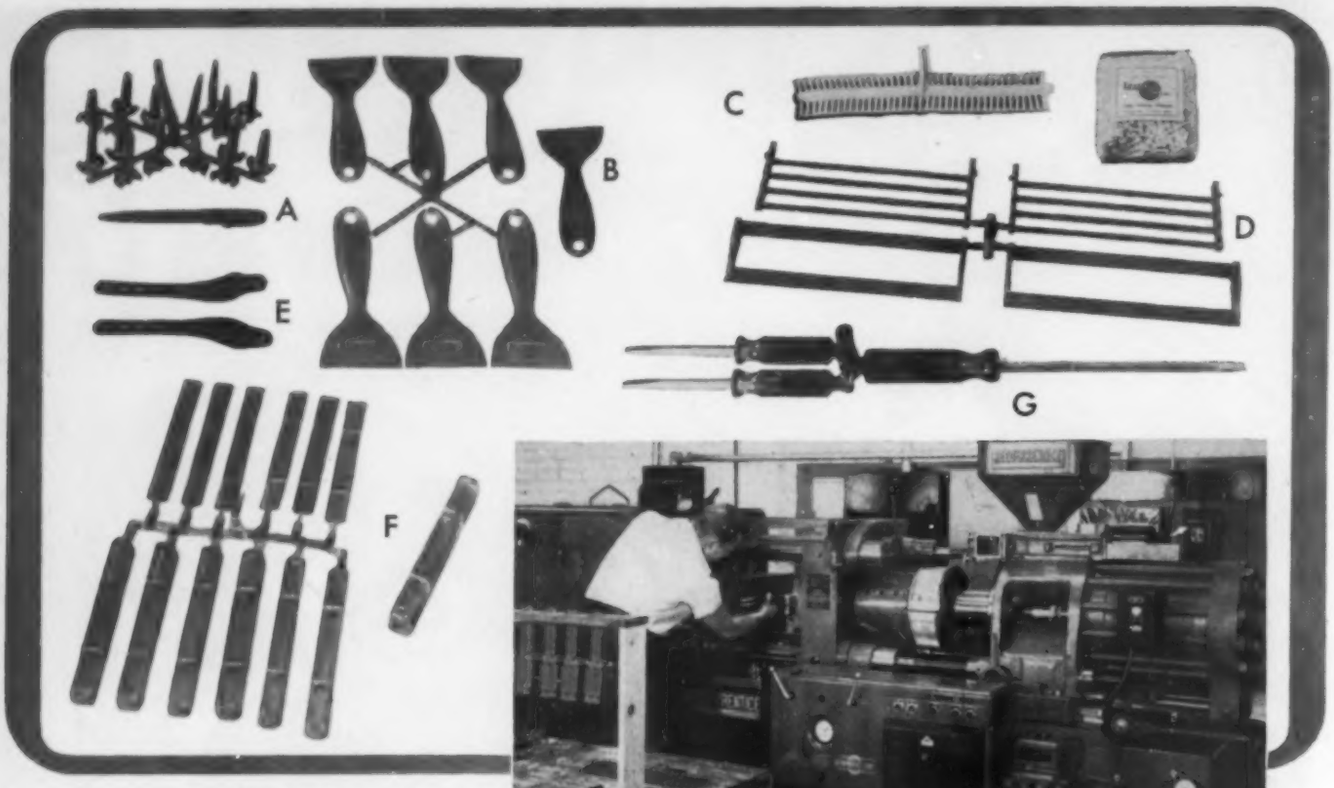
Grommet is two-piece assembly. Wire is placed across base piece. Top section is squeezed into assembly with pliers, locking wire in a safe hairpin turn. Grommet is then snapped into hole in appliance chassis. (Nylon grommet molded by Mack Molding Co., Inc., Wayne, N.J., for Heyman Manufacturing Co., Kenilworth, New Jersey.)

WELCOME NEWS for appliance manufacturers, underwriters and consumers is a new strain-relief grommet (or bushing) molded from Du Pont nylon.

Anchored into the chassis of the appliance, this mighty little nylon grommet keeps a tight, safe grip on lead-in wire. It absorbs the stresses of tugs and twists . . . protects connections against stripping, short circuits and moisture . . . adds a safety feature and a sales boost too. Nylon outpointed all other grommet materials tested by the manufacturer. Under heat test, for example, the nylon grommet withstands temperatures up to 400°F. It is economical to install . . . and it lasts the life of the equipment.

Want to improve an old product . . . design a new one? Look to nylon . . . and other Du Pont plastics . . . for a lift to success and more sales. Write for literature. E. I. du Pont de Nemours & Co. (Inc.), Plastics Department, Room 369 Arlington, New Jersey.

DU PONT
REG. U. S. PAT. OFF.
Plastics
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY



See keyed explanation below of products molded on 10D-8 Oz. machine.

HERE'S MACHINE "PRODUCT-ABILITY"...

Ample proof of the "product-ability" of REED-PRENTICE plastic injection molding machines is shown by the widely diversified line of products above, all molded from various materials by the LESTER MOLDING CO., of Pasadena, Calif., on the 10D-8 Oz. model. Unlimited market possibilities are open to this molder, because these machines maintain accurate and constant control of the three most vital molding variables . . . time, temperature and pressure!

Accurate delivery of just the right amount of material per shot to the heater, constant control of plasticizing, fast action of the injection plunger and high locking pressure . . . permit complete handling of the entire range of thermoplastics . . . insure perfectly filled cavities. That's why the Reed-Prentice 10D-8 Oz. machine has "product-ability" . . . will mold the Tie Valet, 21" long (Fig. D) or the #6-32 oval head plastic screws (Fig. C) with perfect compensation for different material and mold requirements.

Consult our engineers regarding your machine and mold problems or about the use of special heaters and nozzles for certain types of plastic materials. Write Dept. D for complete information — models available in 4, 8, 10, 12, 16 and 22 Oz. capacities.

A: Full gate of fountain pens and single pen, made from acetate butyrate.
B: Full gate, crackle finish bug scrapers, made from polystyrene.
C: Full gate of #6-32 oval head screws, made from vinylite — also handy bag pack.
D: Full 21" length gate of Tie Valet, made from polystyrene.
E: Toy spur straps, made from elatimerric vinylite.
F: Full gate clear pen boxes and finished box, made from polystyrene.
G: Full gate of screw drivers with bits.

THE WORLD'S LARGEST MANUFACTURERS OF INJECTION MOLDING MACHINES

INJECTION
REED-PRENTICE CORP.
WORCESTER MACHINES MASS. U.S.A.

CLEVELAND
1213 W. 3rd Street

NEW YORK
75 West Street

LOS ANGELES
2328 S. Santa Fe Ave.

Can you use this *Disappearing Act* in your business?

New wallpapers that stay fresh and new looking for years are the result of a process just perfected by Celanese—working with Richard Thibaut Inc. In this process, LUMARITH* film—with a special satin finish—is bonded to wallpaper...forms a waterproof surface, from which stains, scil marks and smudges can be removed.

Repeated washings with soap and water won't harm the surface or affect the color or pattern. Lipstick marks and other stubborn stains come off safely with carbon tetrachloride cleaners.

IT'S AN IDEA FOR MANY PRODUCTS

This new process opens up opportunities for manufacturers of paper-surfaced household accessories and other products such as wall protectors, shelf coverings, sink and basin splash shields, drawer linings, closet boxes, table mats, luggage covering . . .

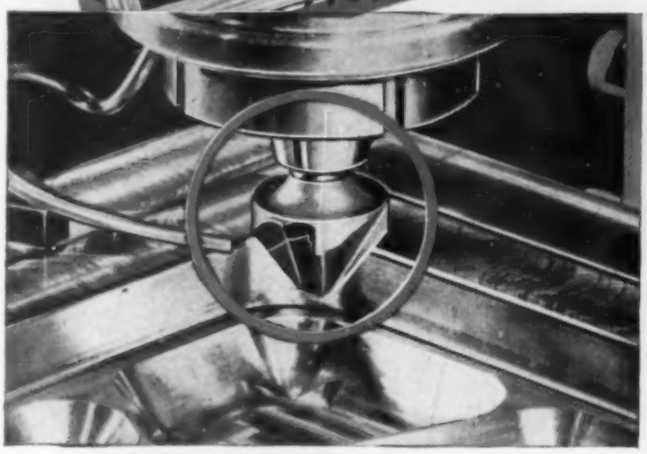
IT'S AN IDEA FOR SMART PACKAGING

A package is subject to the same dust and stain hazards that wallpaper is. Laminating with Lumarith will snap up package beauty and give longer shelf life. Write for additional information and 8-page *laminated* booklet "Lumarith Transparent Film". Celanese Plastics Corporation, Dept. D1, division of Celanese Corporation of America, 180 Madison Avenue, New York 16, N. Y.

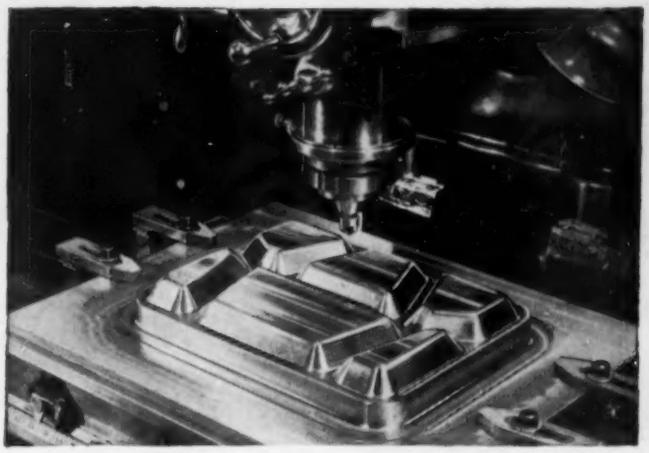
*Reg. U. S. Pat. Off.

LUMARITH* *A Celanese* Plastic*

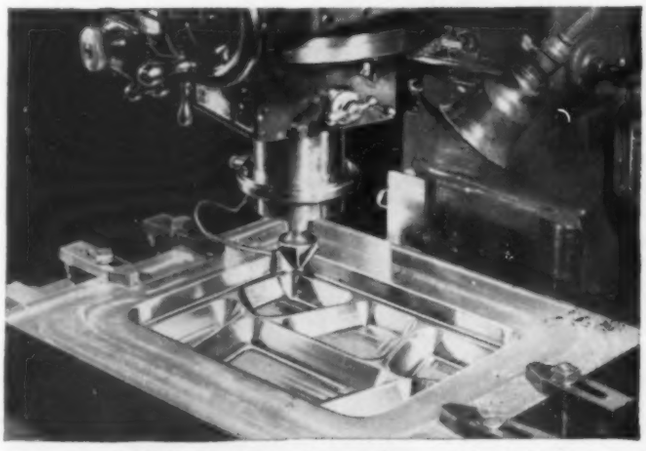
How One Machine Scribed and Machined this Complex Mold — and Made its Own Cutters!



1 **FAST!** The job, a plastic serving tray, required special angles and radii in its cavities. The Model 2D Rotary Head milling machine — a Kearney & Trecker development — completely milled the 3 special form cutters to correct size and shape, including relief and chip clearances.



2 **DIRECT!** The operator accurately located the mold blocks in relation to the Rotary Head center. All layout work, rough and finish milling then were completed with one clamping of the workpiece. No models or templets were required. The blueprint was the only guide necessary.



3 **ACCURATE!** Completing the work in a single setup greatly reduced the chance for error. Precision measuring devices and complete control of all combinations of cutter movements, both angular and radial, made this a simple job of geometric construction for the operator.

4 For more facts of how you can get Fast, Direct, Accurate results on other mold, tool, die, pattern, toolroom and general production work, using the Rotary Head Method, write for bulletin 1002C on the Model 2D Rotary Head Milling Machine.

KEARNEY & TRECKER CORPORATION
MILWAUKEE 14, WISCONSIN

4720

PRACTICAL LIGHTING IS *flexible* FOR EACH INDIVIDUAL ...FOR EACH TYPE OF WORK

Few persons see exactly alike. Even on similar jobs they have different—and changeable—lighting needs. Consider how these variations multiply when you plan to compensate for dark locations... to provide high level illumination for precision machining, fast assembly, close inspection, drafting or accounting.

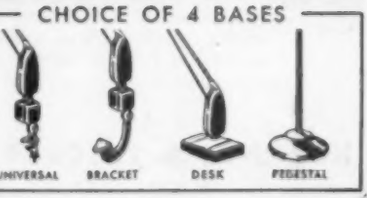
Then you'll understand why we stress the Dazor *Floating* Lamp's *flexibility*: its capacity for delivering the right amount of light for the *individual* at the right place for the *type of work*. Dazor's exclusive *Floating* Arm enables the user to raise, lower, push, pull or tilt the reflector anywhere within the broad area reached by the lamp. Once guided to the point selected, a patented mechanism holds it; there's nothing to fasten.

Your choice of advanced Dazor lighting is a logical step toward improving the safety record, increasing output, curtailing errors. It also puts you in good company. Just observe as you examine photographs of progressive concerns in popular magazines, how often Dazor *Floating* Lamps appear as "part of the picture."

Phone Your Dazor Distributor for an on-the-job demonstration of Dazor efficiency. In the event you require the distributor's name, write to Dazor Manufacturing Corp., 4481-87 Duncan Ave., St. Louis 10, Mo. *In Canada* address inquiries to Amalgamated Electric Corporation Limited, Toronto 6, Ontario.

MOVES FREELY INTO ANY POSITION AND STAYS PUT—*WITHOUT LOCKING*

CHOICE OF 4 BASES



DAZOR FLOATING LAMPS

FLUORESCENT and INCANDESCENT

At *Kelvinator*

Tough jobs like this are easy with H-P-M

Plastic parts like these are being produced on 16-ounce H-P-M injection molding machines by Nash-Kelvinator Corporation.

Bulletin 4405 describes the 16-ounce H-P-M plastic molding machine. Send for your copy today.

Only 70 seconds per cycle is required to make this pair of large plastic moldings for the new Kelvinator refrigerators . . . high-speed, accurate, profit-making production at its best.

These pieces rank among the largest and longest ever produced on a single injection chamber machine. Made of white polystyrene, the casting weighs 12 ounces and has a projected area of 120 square inches.

For *Your* Plastic Production—There's a size of H-P-M injection molding machine to suit your plastic parts production. Completely self-contained, you have only to connect it to electric power and cooling water, and it's ready to go to work.

All actions are hydraulically controlled; no complex mechanisms. Operation is quickly mastered, so your labor costs with an H-P-M injection molding machine are low.

THE HYDRAULIC PRESS MANUFACTURING COMPANY 1010 Marion Road, Mount Gilead, Ohio, U. S. A.

Branch Offices in New York, Philadelphia, Cincinnati, Cleveland, Detroit and Chicago. Representatives in other principal cities.
Export Dept: 500 Fifth Avenue, New York, N. Y. Cable—"Hydraulic"

HPM

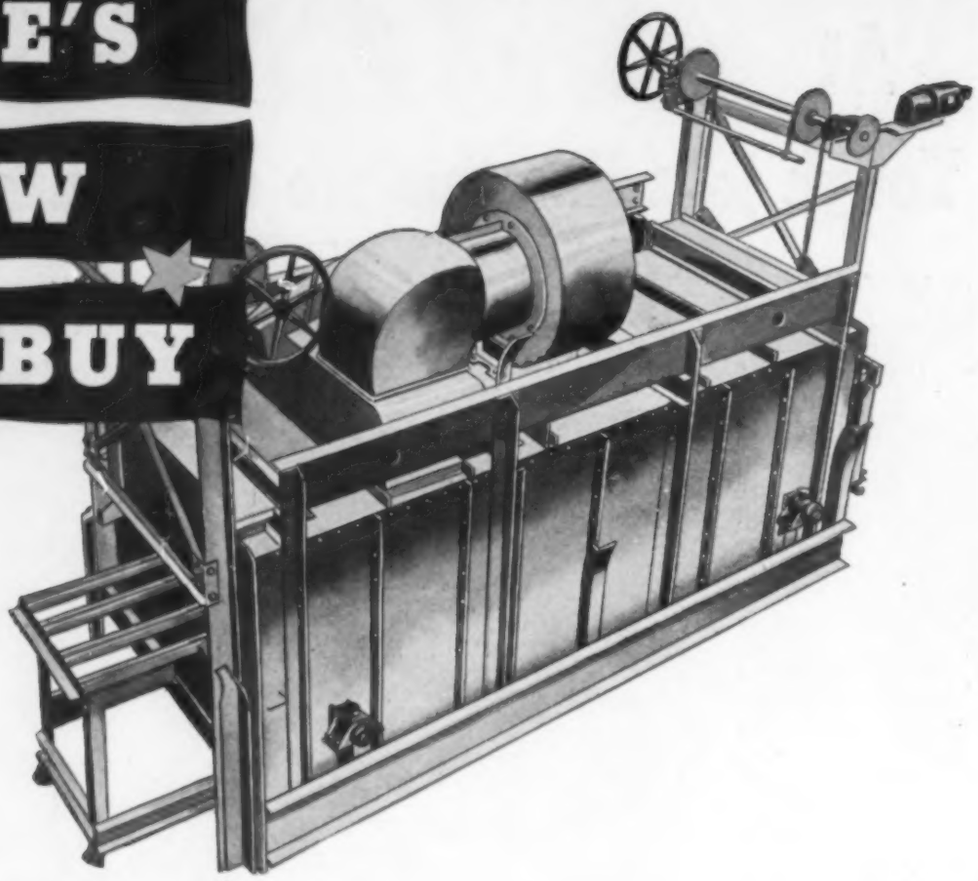
All-Hydraulic Self-Contained

Injection Machine

FOR MOLDING THERMO-PLASTICS

REVOLUTIONIZING PRODUCTION WITH HYDRAULICS SINCE 1877

HERE'S HOW YOU BUY



Industrial

FURNACES • OVENS

This booklet is designed to aid you in selecting the type of Furnace or Oven you need; it shows you how to prepare submission of your exact specifications.

A great many types of this highly specialized equipment are located throughout the country. All you need do to locate the particular Furnace or Oven for your specific job, is to fill out the specification sheet in the back of the new WAA booklet. If you have not already received a copy of this booklet, one will be mailed you upon request. Return the specification sheet to the War Assets Administration in Washington. WAA does the rest—and will arrange for inspection of the equipment before purchase.

EXPORTERS:

Industrial Furnaces and Ovens are available for your overseas customers. Act now to fill their requirements.

MAIL THIS COUPON TODAY!

To: War Assets Administration
Machinery and Industrial Equipment Division
Washington 25, D. C.

Please send me your booklet called "Industrial Furnaces and Ovens."

NAME .....

TITLE .....

FIRM .....

ADDRESS .....

CITY ..... STATE .....

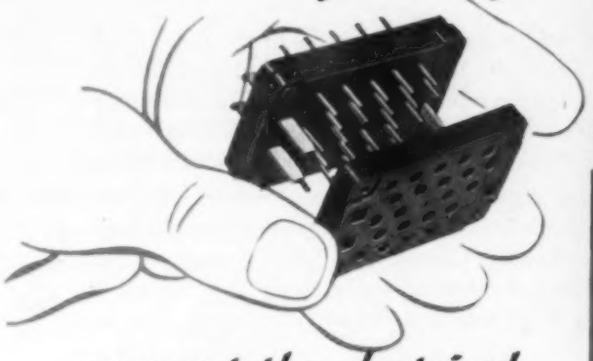
OFFICE OF GENERAL DISPOSAL

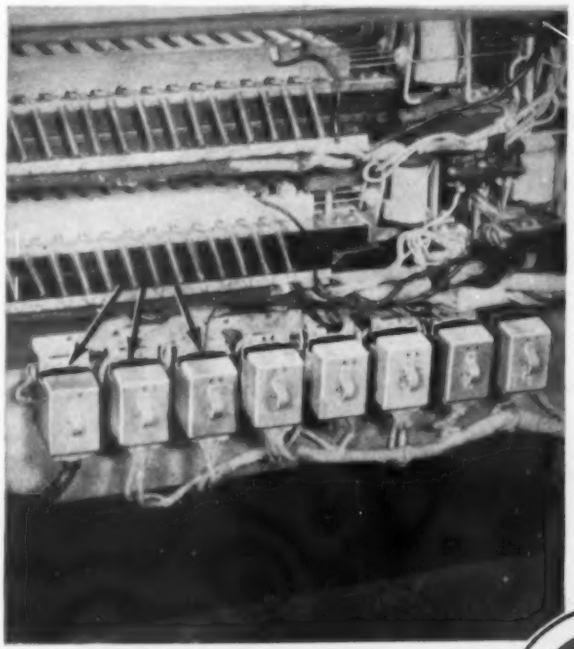
WAR ASSETS ADMINISTRATION

Offices located at: Atlanta • Birmingham • Boston • Charlotte Chicago • Cincinnati • Cleveland • Denver • Detroit • Grand Prairie, Tex. • Helena • Houston • Jacksonville • Kansas City, Mo. Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans New York • Omaha • Philadelphia • Portland, Ore. • Richmond • Salt Lake City St. Louis • San Antonio • San Francisco • Seattle • Spokane • Tulsa 1316

CUSTOMER SERVICE CENTERS IN THESE AND MANY OTHER CITIES

Multiples of these paired Plastic Plugs ingeniously connect the electrical circuits of the WURLITZER ORGAN





Above photograph, by courtesy of The Rudolph Wurlitzer Company, indicates the position of referred-to plastic plugs in the Wurlitzer Organ. Arrangement facilitates inspection and ready access for disassembly of the interior Wurlitzer Organ parts.

"Thru the development of these plugs," states the Rudolph Wurlitzer Company, "we are now able to divert the electrical circuits from one normal path into many, giving the Wurlitzer Organ tremendous flexibility over prior methods. By utilizing plastic assemblies on these disconnect plugs, we insure ourselves against atmospheric conditions which normally cause trouble on such an important electrical unit."

We, at Consolidated, are proud to have been called upon by Wurlitzer engineers to build the necessary transfer type semi-automatic dies for these parts—and to precision-process them, in quantity, of a special phenolic with the required structural strength and insulating qualities.

For like satisfaction, when you are planning for plastics—call Consolidated. Inquiries invited!

"Your Blueprint in Plastic"

Consolidated
MOLDED PRODUCTS *Corporation*
309 CHERRY STREET,
SCRANTON 2, PA.

Branches: NEW YORK, *1790 Broadway* • CHICAGO, *549 W. Randolph St.* • DETROIT, *550 Maccabees Bldg.* • CLEVELAND, *4614 Prospect Av.* • BRIDGEPORT, *211 State Street.*
PRODUCT DEVELOPMENT • MOLD DESIGN • MOLD CONSTRUCTION • PLUNGER MOLDING • TRANSFER MOLDING • INJECTION MOLDING • COMPRESSION MOLDING

STILL CURRENT WITH KEARNEY

Think of protective devices for electrical distribution systems, and you think of Kearney Trip O Matic Fuse Cut-outs. Think, too, of Kearney's experience with plastics. In 1934, a new door was designed with the engineering help of Kurz-Kasch engineers. They got a phenolic door improved in strength, insulation qualities, weather resistance, interchangeability and cost. Today —hundreds of thousands of units later—they find they're getting even more: *current production from original molds*—with production refinements giving greater mould output than ever! Good plastics applications pay off!

50 Million Plastics Experts Can be WRONG!

EVERYBODY'S a plastics expert now, thanks to the more lurid pulp writers. But while they're looking through their crystal balls at plastic bathtubs and 1-piece plastic autos, we're just sticking to slide rules, property charts and all the down-to-earth facts about plastics that we've learned from plenty of years of hard knocks.

This door for a fuse cut-out assembly shows exactly what we mean. It's moulded plastic because the properties of phenolic material improve it functionally. Costwise, too. And because of the forward-looking design and careful mould-making that went into the job back in 1934, it's just as effective and salesworthy now as it was then.

Isn't *that* the practical way to look at the future—especially as it applies to *your* product? For plastics where plastics belong—for plastics engineered today for profitable use through the years to come—talk things over now with a Kurz-Kasch engineer.

Kurz-Kasch

FOR OVER 31 YEARS PLANNERS AND MOULDERS IN PLASTICS

Kurz-Kasch, Inc. • 1415 South Broadway • Dayton 1, Ohio

Branch Sales Offices: **New York • Chicago • Detroit • Los Angeles • Dallas St. Louis • Toronto, Canada •** ***Export Offices:*** **89 Broad Street, New York City**

Here's the newest addition to the NRM Extruder Line

FOR more than a year now, the first models of the new 3½" "Cub" extruder have been in regular production. No longer in the laboratory or development stage, these units have proved their performance in daily production so that the following operating data are based on actual records.

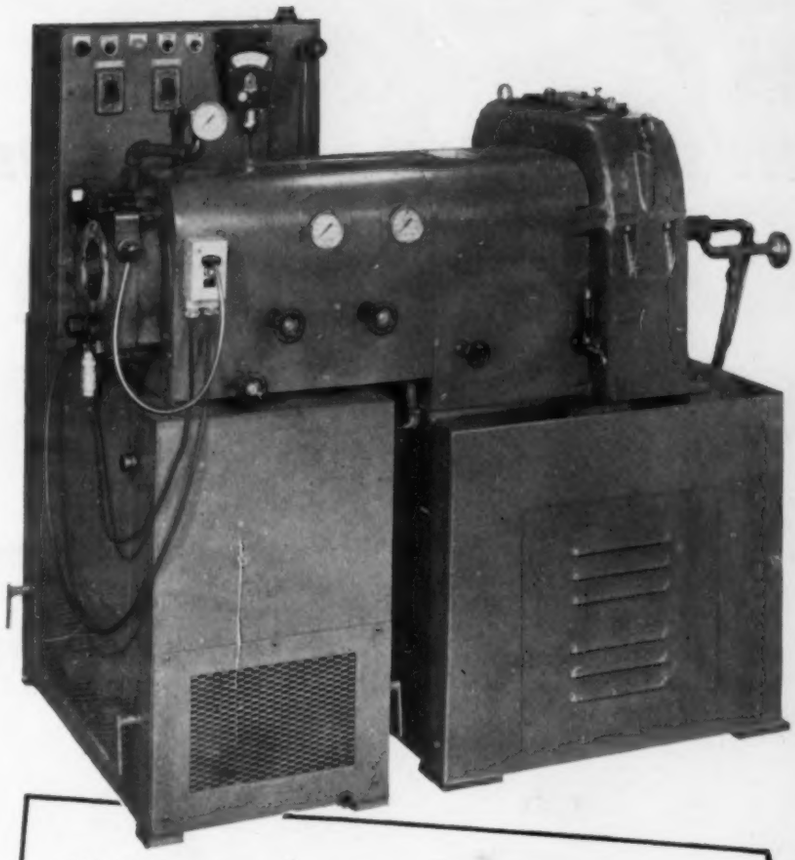
The Cub is a short-barreled oil heated extruder equipped with a 3½" screw, with a barrel only half as long as the regular 3½" extruder. It requires much less floor space, less horse power, there's less heat loss; wear is reduced, and with it, maintenance costs.

The Cub provides precisely accurate control of tolerances and quality to a degree not possible before. It handles all the major non-corrosive thermoplastic materials without changing screws or cylinder sections. Its compact design simplifies installation problems in limited spaces.

With a capacity of up to 120 lbs. per hour, this new NRM Cub extruder may be the best size and type of equipment for your particular work and production requirements.

For many uses, it is more economical to operate, resulting in direct money savings to you.

To get *all* the facts, write today for complete descriptive data and operating characteristics . . . ask for full information on the new NRM Cub Extruder.



SPECIFICATIONS — NRM 3½" "CUB" EXTRUDER

Capacity up to 120 lbs. depending on material, size of extrusion and other factors.

Dimensions

- Length—5' 0" (Incl. Rotary Union)
- Width Overall—32"
- Height Overall—4' 5⅛"
- Height from floor to screw center—3' 5½"

Equipment

- 18 KW Oil Heating and Instant Cooling Unit
- Weston Thermometers for Individual Heating Zones
- Die Heater Control
- Swing-Type Die Head
- Herringbone Transmission
- 19 HP Reliance D.C. Drive Motor with A.C.-D.C. Control (Motor Generator)

NATIONAL RUBBER MACHINERY CO.
General Offices: AKRON 8, OHIO

Plastics MACHINERY DIVISION

EXPORT DISTRIBUTORS: OMNI PRODUCTS CORPORATION, 460 FOURTH AVE., NEW YORK16, N. Y.

Here's the fastest machine of its type on the market

THE NEW 350-TON

IMPCO

Plunger or Transfer Molding Machine

PLASTIC MOLDING MACHINERY DIVISION

Improved **PAPER MACHINERY CORPORATION**

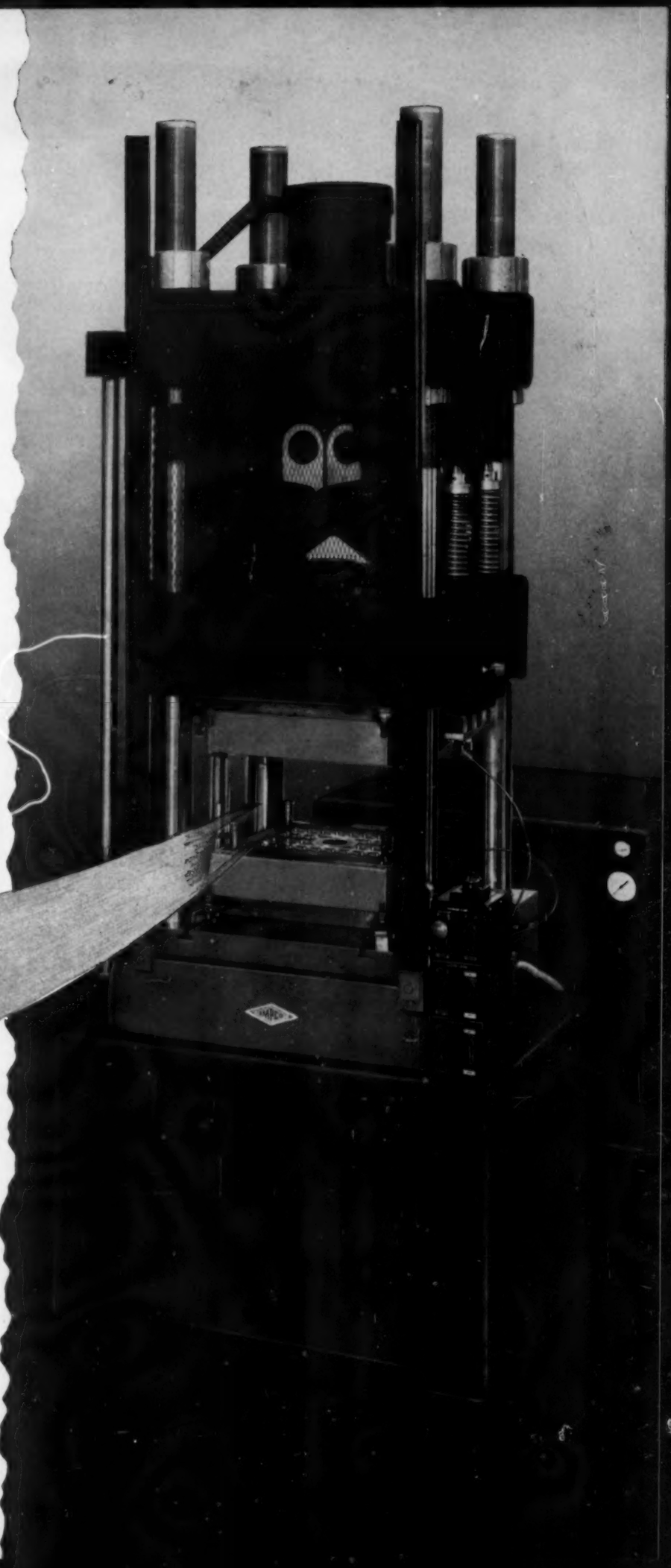
NASHUA • NEW HAMPSHIRE

Here's why the Impco is faster . . . more productive

The 50-ton high speed plunger or transfer cylinder is located *beneath* the stationary platen. This means quicker loading of pre-forms, quicker cull removal, shorter plunger travel. Because of these advantages, pre-forms may be heated to a higher temperature adding up to considerable saving in time . . . more production.

350-ton Clamping Pressure
50-ton Plunger or Transfer Cylinder . . . or a 7 to 1 ratio
(as against the usual 5 to 1 or less).

Pressure on both may be adjusted to suit conditions as they are powered by separate pumps. This cannot be accomplished by any similar machine equipped with only one pump.



The top platen can be stopped instantly in any position . . . *positive* safety devices will *not* let the machine close until the *safety gate is down.*

Let us give you the *complete* story. Write us today or plan to see it in Nashua.

This machine is also built in 50-ton capacity.

MP-7

TO MEET THE GROWING INDUSTRIAL DEMAND...

AERO BRAND STEARATES

CALCIUM... ZINC... ALUMINUM... MAGNESIUM

CYANAMID'S large-capacity, rigidly controlled manufacturing facilities offer exceptional advantages as your source of supply. Thorough inspection and meticulous control at each step from the acid to the final packaged product bearing the AERO* BRAND Seal make certain that your stearates will be fine and fluffy... with clean, smooth dusting lube qualities... and possessing the many other superior diversified processing characteristics inherent in each type. For product quality... for service... for all-around dependability... it's CYANAMID AERO BRAND STEARATES.

CYANAMID'S MODERN FACILITIES BECOME YOUR DEPENDABLE SOURCE OF SUPPLY WHEN YOU SPECIFY...

AERO BRAND STEARATES

Industrial Chemicals Division

AMERICAN CYANAMID COMPANY

30 ROCKEFELLER PLAZA · NEW YORK 20, N. Y.

*Trade Mark

Cover the Broad Range of Molding and Laminating needs

BIRDSBORO HYDRAULIC

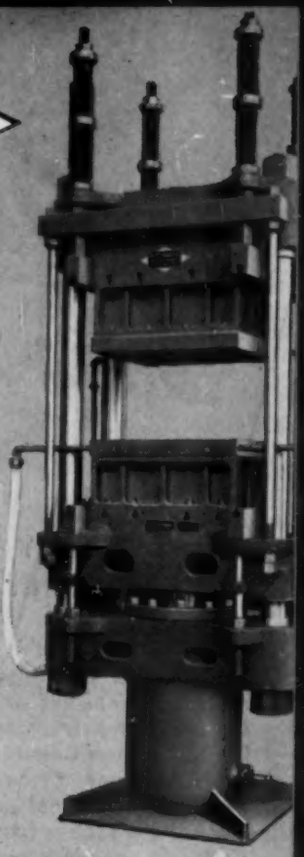
with BIRDSBORO HYDRAULIC PLASTIC PRESSES

With the multitude of new developments in the plastics field, Birdsboro has met the demand for improved plastic molding and laminating presses. The presses illustrated can give you only an inkling of the many types and sizes produced by Birdsboro.

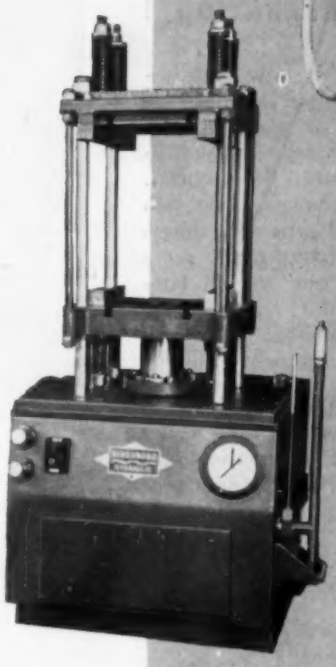
Simplified design, adequate rigidity to insure accuracy in molding and flexibility of control all play a part in providing fast and economical production.

Birdsboro Hydraulic Plastic Molding and Laminating Presses are made in a wide range of sizes and types with manual or automatic control for self-contained or accumulator operation.

To meet your needs for versatile plastic presses that you can depend on—look at the Birdsboro line.



▲ 265-ton Moldi Press with 15" ram a equipped with spring turned top and bott strippers.



◀ 25-ton or 5u- self-contained ser automatic compress molding press.

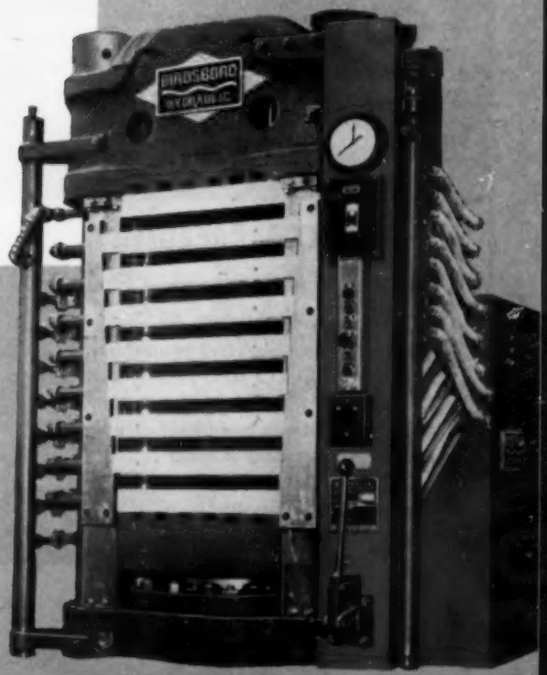
BUILDERS OF: Hydraulic Presses - Steel Mill Equipment - Rolls - Special Machinery - Crushing Machinery

Birdsboro Steel Foundry & Machine Co. • Birdsboro, Pa.

BIRDSBORO

HYDRAULIC PLASTIC PRESSES

▼ 500-ton 8-opening steam platen press of self-contained type with manual and automatic (timed) cycle control.



◀ Heavy duty plastic compression molding press with self-contained pump unit made in 600 ton, 900 ton and 1200 ton sizes.

This ONE DOUBLE-SECTION Pre-Heater does the work of TWO!

Save Time! Cut Costs!

on All Your
PREHEATING OPERATIONS!

Doubly Useful is this new and improved type of Preheater. Each of its *two sections* can be operated at a *different* temperature by simply closing the bafflers between the sections. With this *one* Preheater, you can handle *two* different jobs with different heating requirements at the *same time*. To maintain one overall temperature throughout the Preheater, you simply open the baffles.

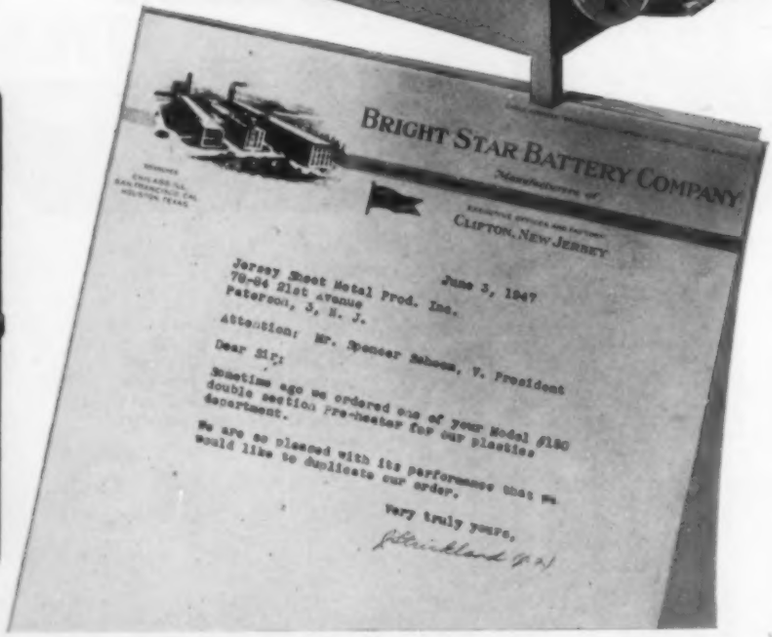
This *flexibility* of operation gives the Double-Section Preheater an unusually wide range of applications. It is sure to be the *busiest and most useful* Preheater in your plant!

CAPACITY: Equal to that of six 8-ounce injection molding presses.

WHEELCO CAPACITROL

For CLOSER Temperature Control

No "mechanical controller" can possibly give you such *close temperature control* as you get with the WHEELCO CAPACITROL. When used for indicating and on-off temperature control, an indicator movement of only .006" produces positive control action.



BRIGHT STAR BATTERY COMPANY
Manufacturers of
CLIFTON, NEW JERSEY

June 3, 1947

Jersey Sheet Metal Prod. Inc.
78-84 21st Avenue
Paterson, 3, N. J.

Attention: Mr. Spencer Babcock, V. President

Dear Sir:

Sometime ago we ordered one of your Model #180 double section pre-heater for our plastics department.

We are so pleased with its performance that we would like to duplicate our order.

Very truly yours,

★ If you are interested in more speed and greater efficiency at *lower cost*, phone or write for full information about the Double-Section Preheater.

JERSEY SHEET METAL PRODUCTS, INC. 78-84 21st Avenue PATERSON, N. J. SHerwood 2-8174

Two Headliners get together on the radio!

picks KYS-ITE for revolutionary new Self-Charging Portable

CLOSE-UP OF KYS-ITE 3 PART COMBINATION:

A—Handle

B—Cover (directly above is shown interior view with projections and metal inserts)

C—Loop antennae form

Things happen before a big manufacturer launches a new product in a highly competitive market. Materials are tested . . . re-tested . . . must get a complete okay before they "get the order." Take, for instance, the cover assembly of General Electric's new portable; specifications required the material to be:

unusually adaptable so it could be molded into sections of varying thickness and incorporate permanent metal inserts; also dimensionally stable for close tolerance alignment.

light yet strong; easily carried but rugged enough to take none-too-gentle handling. (A cinch for lightweight KYS-ITE whose impact strength is up to 5 times that of ordinary plastics.)

non-conductor; dielectric, non-resonant and non-reverberating.

On these counts, KYS-ITE more than measures up—and offers "extras," too. Outstanding for lustrous beauty, its colors are also highly durable—an integral part of the material itself. In short, this versatile plastic brings you a combination of properties no other type of material possesses.

KEYES FIBRE COMPANY
420 Lexington Avenue
New York 17, New York
Plant at Waterville, Maine

KEYES
MOLDED PRODUCTS

Preformed Plastic Combining Long-Fibered Wood Pulp and Synthetic Resin

KYS-ITE

Trade Mark Reg. U. S. Pat. Off.

AN *Open Letter* TO BUYERS OF MOLDED PLASTICS

LESTER-PHOENIX DIE CASTING MACHINES
LESTER INJECTION MOLDING MACHINES

LESTER-PHOENIX *Incorporated*

2711 CHURCH AVENUE · CLEVELAND 13, OHIO

TO MOLDED PLASTICS BUYERS...EVERYWHERE:

● Under today's buying conditions, you are entitled to the best the market affords in molded plastics—and to help you get the best, here is a suggestion:

Send your inquiries to shops equipped with LESTER injection molding machines . . .

Because:

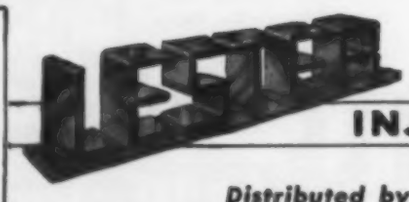
1 LESTER is the oldest name in the great plastic molding industry . . . it stands for more than 30 year's experience in developing and engineering high pressure injection equipment.

2 Many LESTER users are now equipped with the *new* LESTER injection molding machine with the cast one piece, alloy steel frame, vertical injection system and other exclusive LESTER features assuring "high dollar" plastic quality and production . . .

3 And right now, as many LESTER users are in a position to accept new business . . . we are pleased to offer the LESTER users list to all buyers of molded plastics . . . write today for your copy and send your inquiries for molded plastics to LESTER users in your community . . .

Sincerely yours,
LESTER-PHOENIX, INC.

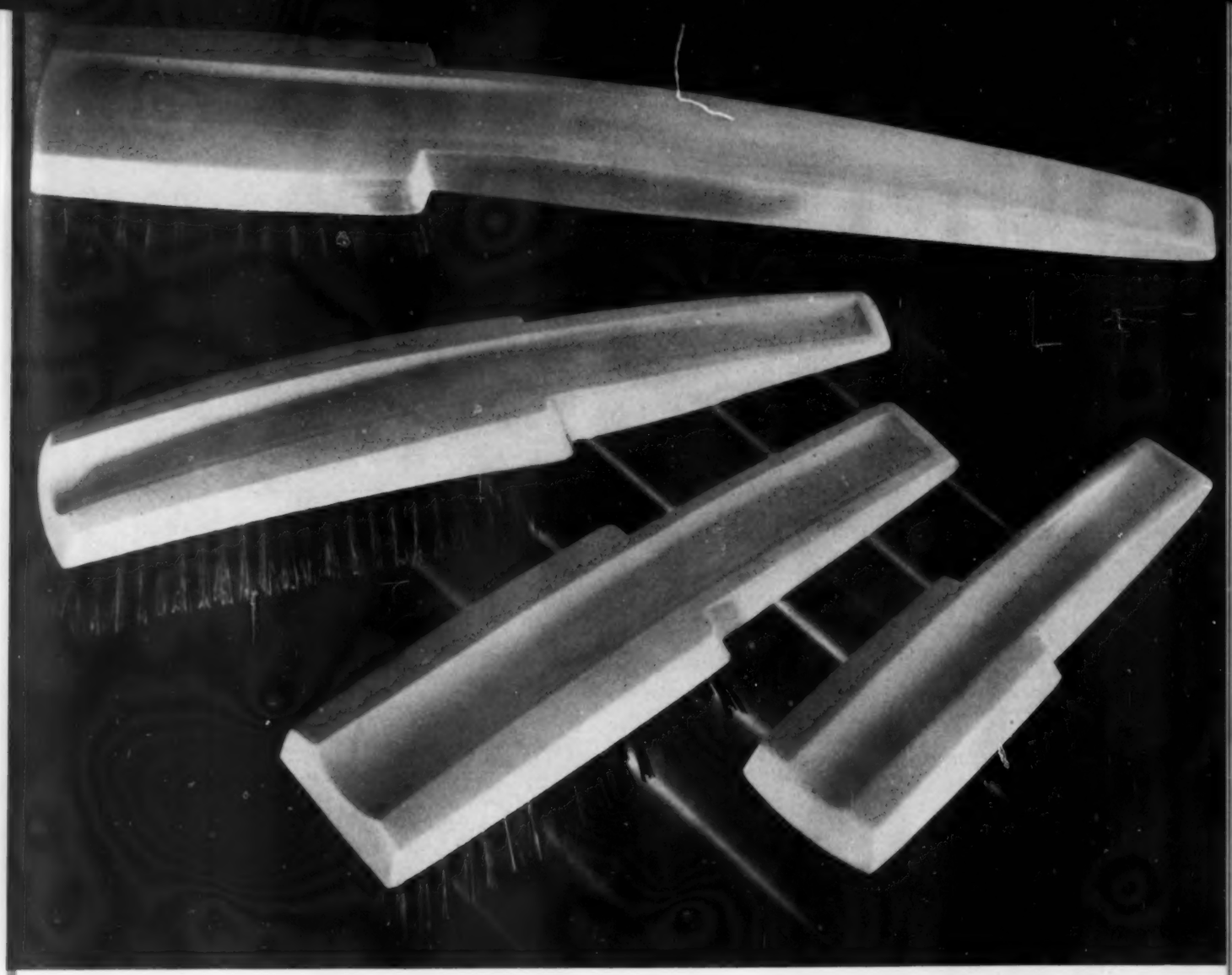
● *This is the third of a series of Lester-Phoenix advertisements in the interest of our customers . . . the nation's best plastic molders.*



NEW YORK
CHICAGO
LEOMINSTER
CINCINNATI
LOS ANGELES
SAN FRANCISCO

INJECTION MOLDING MACHINES

Distributed by **LESTER-PHOENIX, INC.**
2621 CHURCH AVE., CLEVELAND 13, OHIO



MOLDED AND PRODUCED BY FULLER BRUSH CO.

Custom Quality for the Millions

Into millions of American homes will go these distinctively styled 1948 model brushes bearing the famous name of Fuller . . . each handle molded from Cellulose Acetate Molding Powders supplied by Chemaco. • To please such a discriminating market, the molding powder must be extremely versatile. It must combine strength with lightness . . . a smooth, warm-to-the-touch surface with an unlimited range of color. It must be dimensionally stable. • From the sales point of view, Chemaco Cellulose Acetate admirably meets these requirements. And from the molder's standpoint, it is economical. Not only is Cellulose Acetate the lowest in cost of the cellulosics, but sprues, gates and rejects may be reground and remolded. There is no waste. • Do you mold articles by the hundreds of thousands . . . by the million? Are you looking for that *custom-made touch* in mass production articles? Consult Chemaco. Write today for our new booklet. • Chemaco Corporation, Berkeley Heights, N. J. Branch office in Cleveland.

Chemaco

CHEMACO CELLULOSE ACETATE PLASTIC MOLDING POWDERS

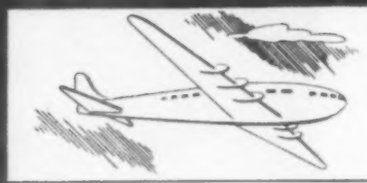
Also Manufacturers of Ethyl Cellulose and Polystyrene

PROTECT and INSPECT with TRANSPARENT PLASTICS

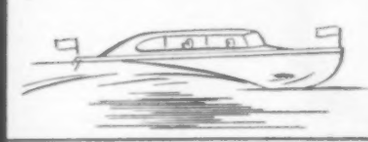
Transparent acrylic plastic is the ideal material to use when strength, transparency and the ability to be formed into simple or compound curves are desired. Acrylic plastic transmits every color of the spectrum with 92% efficiency, and retains its transparency permanently despite aging and weathering. That's why acrylics are the best material for shields and housings on all types of products where it is desirable to observe inner workings, or when a formed part must possess excellent optical properties in addition to strength and resistance to breakage.

Transparent acrylics can be furnished as a sandwich structure in which the center core is made of Butacite for obtaining greater strength and impact resistance. The laminating does not materially change the optical properties which, in turn, makes these materials ideal for aircraft canopies, instrument cases, machine safety shields, marine windshields, lighting shields, roof panels on busses and taxicabs, and a host of other applications.

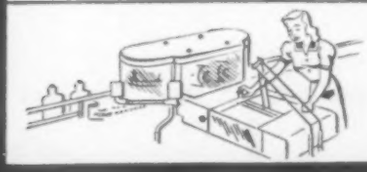
Because of our long association with aircraft companies in developing new parts and helping solve production problems, you will find our engineering experience in the fabrication of acrylics most valuable in helping you adapt transparent acrylic plastics to your product.



Our long experience with fabricating aircraft parts has made us a leader in this field. Aircraft canopies and astradomes are among the many fabricated acrylic parts that roll continuously from our production line.



Curved windshields and windowpanes for boats can be successfully produced with fabricated transparent plastics.

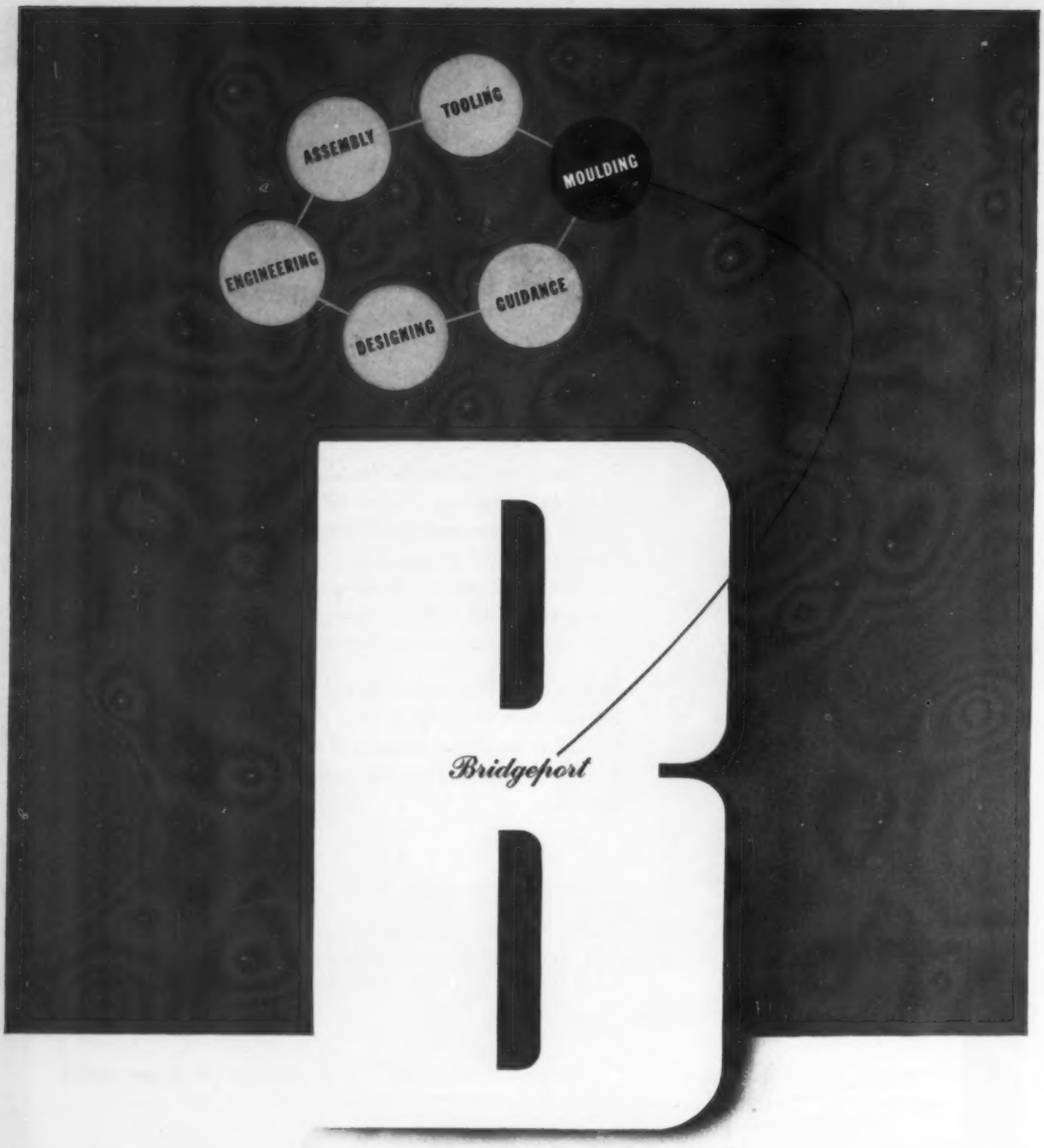


For food, dairy, or processing equipment where the processed material must be observed, transparent acrylic plastics are becoming increasingly valuable.

Swedlow PLASTICS CO.

5527-33 District Blvd. • Los Angeles 22, Calif.

West Coast Distributors:
FIR-TEX OF SOUTHERN CALIFORNIA, 812 EAST 59th STREET, LOS ANGELES, CALIFORNIA Telephone: ADams 8101



Moulding that meets exacting demands of latest moulding materials is another phase Bridgeport offers. From start to finish Bridgeport is completely equipped to handle your moulding problems. For plastics . . . think of Bridgeport.

BRIDGEPORT MOULDED PRODUCTS, INCORPORATED

BRIDGEPORT CONNECTICUT

A complete line of *Phenolic Resins* for the world's finest products

by...

VARCUM

TYPICAL EXAMPLE OF MANY RECENT VARCUM RESIN APPLICATIONS

- **RESINOID GRINDING WHEELS — ABRASIVE DISCS AND BELTS**
- **MOLDED BRAKE LININGS AND BRAKE BLOCKS**
- **EXTRUDED BRAKE LININGS**
- **IMPREGNATION OF ASBESTOS TAPE**
- **BONDING BRAKE LININGS TO BRAKE SHOES**
- **LOW COST, LIGHT COLORED COATING AND IMPREGNATION OF PAPER AND CLOTH**

Speedier production — lower cost — greater strength — longer life — All, or any one of these may be reason for you to investigate Varcum Phenolic resins. The Varcum organization, successfully serving many of America's largest manufacturers, is at your service, ready to custom develop the **right** formula to meet your most exacting requirements.

VARCUM CHEMICAL CORP.

Niagara Falls, N.Y.

ALL THE FLUID POWER
You Can Use

Here's dependable hydraulic power. Smooth. *Shockless.* Practically limitless. A single Elmes Pump-Accumulator System will operate *any* number of presses at top capacity, three shifts a day.

Pistonless accumulator design eliminates line shocks for longer life of presses, piping, packing, valves, and dies. Elmes accumulators are ballasted by compressed air—have no *dead weight* which must be brought to an abrupt stop when flow is shut off—have no *internal* moving parts whatever; no ram; no packings . . . no leakage!

Patented Elmes controls work automatically to maintain high and low liquid limits within the vessel —*prevent* excessive withdrawal.

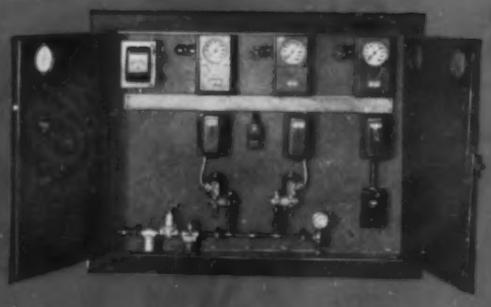
During periods of greatest demand, pump output to presses is augmented from the accumulator supply. As demand slackens, excess pump capacity recharges the accumulator. And when the upper liquid level is reached, the pump is bypassed. Throughout this entire cycle, the accumulator acts to *cushion* fluid flow.

The Elmes Pump-Accumulator System is a scientifically engineered combination of Elmes Accumulators, Elmes Patented Controls, and Elmes High-Pressure Pumps. We'll be glad to give you all the facts.

ELMES ENGINEERING WORKS *of* AMERICAN STEEL FOUNDRIES
225 N. Morgan St., Chicago 7, Ill.
Distributors from Coast to Coast

ELMES
Since 1851
HYDRAULIC EQUIPMENT

A typical Elmes pistonless-type accumulator. Has no packings; no internal moving parts. Can be set on usual factory floor. Compressed air ballasting assures uniform flow without line shocks; gives close pressure regulation. All pressures and volumes.



Cabinet-mounted electric control panel. Located wherever convenient near pressure vessel. Can include recording liquid level gauges on large installations.

Elmes six-plunger horizontal pump for 150 to 500 h.p. requirements, and pressures up to 35,000 p.s.i. Smaller pumps are vertical type. All embody every refinement of design and construction.

Send for
Accumulator Bulletin No. 5100 and
High-Pressure Pump Bulletin No. 1020.

METAL-WORKING PRESSES · PLASTIC-MOLDING PRESSES · EXTRUSION PRESSES · PUMPS · ACCUMULATORS · VALVES · ACCESSORIES

"Phillips Screws Stopped Costly Damage by Slipping Drivers"

says COLUMBUS SHOW CASE CO.

Right — No place for a driver to slip out of a screw head and run wild . . . and it doesn't with Phillips Screws.

Below — With any other type screw than a Phillips, applications like these would require slow, careful, and costly driving.

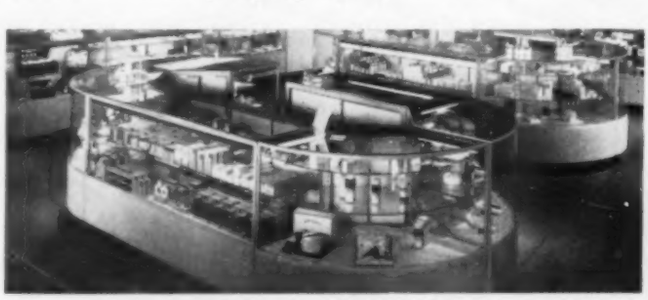
Excerpts from another of the series of independent surveys by James O. Peck Co. of assembly savings made with Phillips Screws in leading plants.

"In show case assembly," explained the plant manager, "you're dealing with expensive, highly finished materials. That's one big reason we've been using Phillips Recessed Head Screws for over ten years.

"DRIVER SLIPPAGE ELIMINATED 100%. We went to Phillips Screws because we'd had so much driver slippage with slotted screws. A driver jumping out of the slot would often gouge finished wood, so that expensive repairs or an entirely new piece were necessary. Often costly plate glass would be broken. Phillips Recessed Head Screws put a stop to such spoilage completely.

"NO BURRED HEADS HAZARD. Phillips Screws don't burr, so polishing cloths are not snagged, or merchandise such as stockings and underwear damaged. In show cases for food, where moisture is present, this freedom from burring leaves the plating on screw heads intact so that there is no unsightly rusting.

"DRIVING TIME SHORTENED . . . APPEARANCE IMPROVED. The Phillips Recess is so much easier to locate that a "third hand" isn't needed in such operations as fastening together two pieces of wood. You start driving sooner and finish faster. And the attractive Phillips Head adds an extra touch of refinement to the show case design."



Typical of the ultra-modern, beautifully finished show cases in which the Columbus Show Case Company uses thousands of Phillips Screws.

HOW MUCH COULD BETTER ASSEMBLY SAVE YOU? Send for the complete Columbus Show Case report and others, covering wood, metal, plastic products . . . packed with ideas for saving money on your assembly line. Mail the coupon TODAY.

PHILLIPS *Recessed Head* SCREWS

Wood Screws • Machine Screws • Self-tapping Screws • Stove Bolts

American Screw Co.
Central Screw Co.
Continental Screw Co.
Corbin Screw Div. of American Hdwe. Corp.
Elco Tool & Screw Corp.
The H. M. Harper Co.
International Screw Co.
Lamson & Sessions Co.
Milford Rivet and Machine Co.
National Lock Co.

24 SOURCES

National Screw & Mfg. Co.
New England Screw Co.
Parker-Kalon Corporation
Pawtucket Screw Co.
Pheoll Manufacturing Co.
Reading Screw Co.
Russell Burdsall & Ward Bolt & Nut Co.
Scovill Manufacturing Co.
Shakeproof Inc.
The Southington Hardware Mfg. Co.
The Steel Company of Canada, Ltd.
Sterling Bolt Co.
Stronghold Screw Products, Inc.
Wolverine Bolt Company

Phillips Screw Mfrs., c/o Horton-Noyes
1800 Industrial Trust Bldg.,
Providence, R. I.

Send me reports on Assembly Savings with Phillips Screws.

Name.....

Company.....

Address.....

MP-31

MARKETS. New Orleans' domestic and Latin American markets are "naturals" for the sale of plastics and plastic products. Latin America and the Caribbean area in 1946 imported $17,000,000 of plastic materials and products. About half of the Latin American republics neither manufacture their own plastic materials nor fabricate semi-finished forms of plastics . . . New Orleans' strategic location enables it to serve the more than 30,800,000 inhabitants of the 10 southern states, *plus* the entire Mid-Continent area. At present, less than a dozen plants in the southern states manufacture plastic products, whereas in other regions of the United States hundreds of plastics plants are profitably operated. Opportunity awaits you here.

MATERIALS. Close to New Orleans are a wealth of natural resources, including cotton, soya beans, wood pulp, soda ash, sulphur, bagasse and petroleum derivatives, cellulose, resins, carbon black and various acids. Also, many useful materials such as casein and castor beans are imported through New Orleans and are available here.

TRANSPORTATION. New Orleans' coordinated facilities are the finest: modern, sheltered harbor, 97 ship and barge lines, 8 major air lines, 9 trunk line railroads, well-kept highways, a main part of the 13,000 mile inland waterway network. Raw materials get into New Orleans; finished products get out—fast, efficiently, economically.

YOU CAN'T MISS!

INTERNATIONAL HOUSE

FOREIGN TRADE ZONE

LET US SEND YOU FREE

...a copy of our recently completed study, "The Opportunity for the Manufacture of PLASTICS AND PLASTIC PRODUCTS in the city of New Orleans." Write:

Greater New Orleans, Inc., 1024 Maison Blanche Bldg., New Orleans 16, Louisiana.

GREATER NEW ORLEANS MARKETS TRANSPORT RESOURCES

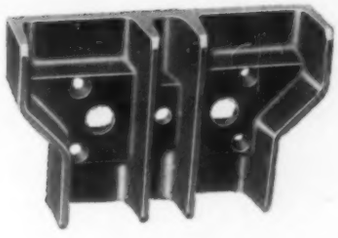
CUSTOMERS

BOTH KINDS

value

Norton experience

COSMETICS



INDUSTRIAL

● When customers ask us whom we do business with, we can do more than mention names they are sure to recognize. We can show them how we've worked with people whose problems are similar to theirs... engineering or packaging problems successfully met with fine moldings.

That's one of the real advantages of having Norton for your molder ...our broad experience.

How will the molding be used? Must it have superior electrical or mechanical properties, or a combination of both? How important is display value...color...style? Shall we mold by compression or extrusion? Experience can provide the right answer in the least time, and our design engineers and technicians have been acquiring this since the industry was an infant.

Two new "right answers" are this complex heavy-duty insulating block for the Safety Car Heating & Lighting Co., and the sifter powder-box top for a famous cosmetics house.

Bring your plastics problems to a molder with a proved record and broad experience...a molder who serves prominent manufacturers in practically every field of industry. We're ready to serve you with skill and with speed. Norton Laboratories, Inc., Lockport, N. Y. *Sales Offices in New York City and Chicago.*

NORTON *Laboratories, Inc.*

SPECIALISTS IN FINE CUSTOM MOLDING

CAPACITY AVAILABLE NOW... Let us help you move fast in the competitive markets of today and tomorrow.

K-PLASTIX *puts a* WINDOW *in a* WASHER

On this project our acrylic engineers joined forces with Kaiser Fleetwings, Inc., to produce—with Plexiglas supplied by Rohm & Haas—a transparent, heavy-duty lid for the new Kaiser Dishwasher.

In the finished lid shown, these K-Plastix engineers successfully incorporated 5 important features:

1. **Low Cost of Production**—Except for knob and valve, the entire lid—including rim and return—is made in one piece with no cemented parts.

2. **Strength to Withstand Hard Usage**

3. **Freedom from Warping**—Both were solved by doming the lid through a combination of skillful deep-drawing and free-blowing operations.

4. **Resistance to Chemical Attack**—Methyl methacrylate was selected for the lid because it's proof against the action of food acids, greases, soap and detergent solutions, and the softening effects of high-temperature washing water.

5. **Easy Clean-ability**—As designed, the streamlined, domed lid provides no inaccesssible crevices where food particles can escape dish cloth or brush.

The entire job serves to illustrate, once again, the ingenuity, experience and fabricating skill which K-Plastix technicians can muster in solving difficult industrial problems involving the use of acrylic plastics.

If you are seeking assistance of demonstrated ability in selecting, designing and fabricating the *right* plastic for a specific product, we recommend that you consult us now.

K-PLASTIX 580 Natoma Street, San Francisco 3, Calif.
UNderhill 4575

* T.H.Q. FLASH!

to All Users of Plastic Tubing

NIXONGRAM

TO ALL USERS OF PLASTIC TUBING =

NIXON HOT EXTRUDED TUBING NOW AVAILABLE TO ALL NIXON CUSTOMERS. MADE IN CELLULOSE ACETATE, ETHYL CELLULOSE AND CELLULOSE ACETATE BUTYRATE. MANUFACTURED TO SAME CLOSE TOLERANCES WHICH HAVE MADE NIXON RIGID TUBING THE STANDARD FOR 25 YEARS. FOR YOUR PLASTIC TUBING REQUIREMENTS, GET IN TOUCH WITH NIXON. =

NIXON NITRATION WORKS
NIXON, N. J.

*Tubing Headquarters

For 25 years buyers of plastic tubing, rods, and extruded shapes have been coming to Nixon for their requirements. Nixon is pleased to announce the addition of hot extruded tubing to its line of cellulosic thermoplastics. Nixon Hot Extruded Tubing will be available in Nixon C/A (Cellulose Acetate), Nixon E/C (Ethyl Cellulose), and Nixon C/AB (Cellulose Acetate Butyrate). Orders and inquiries for Nixon Tubing and other Nixon Plastics will receive our immediate attention.

Nixon

C/N CELLULOSE NITRATE

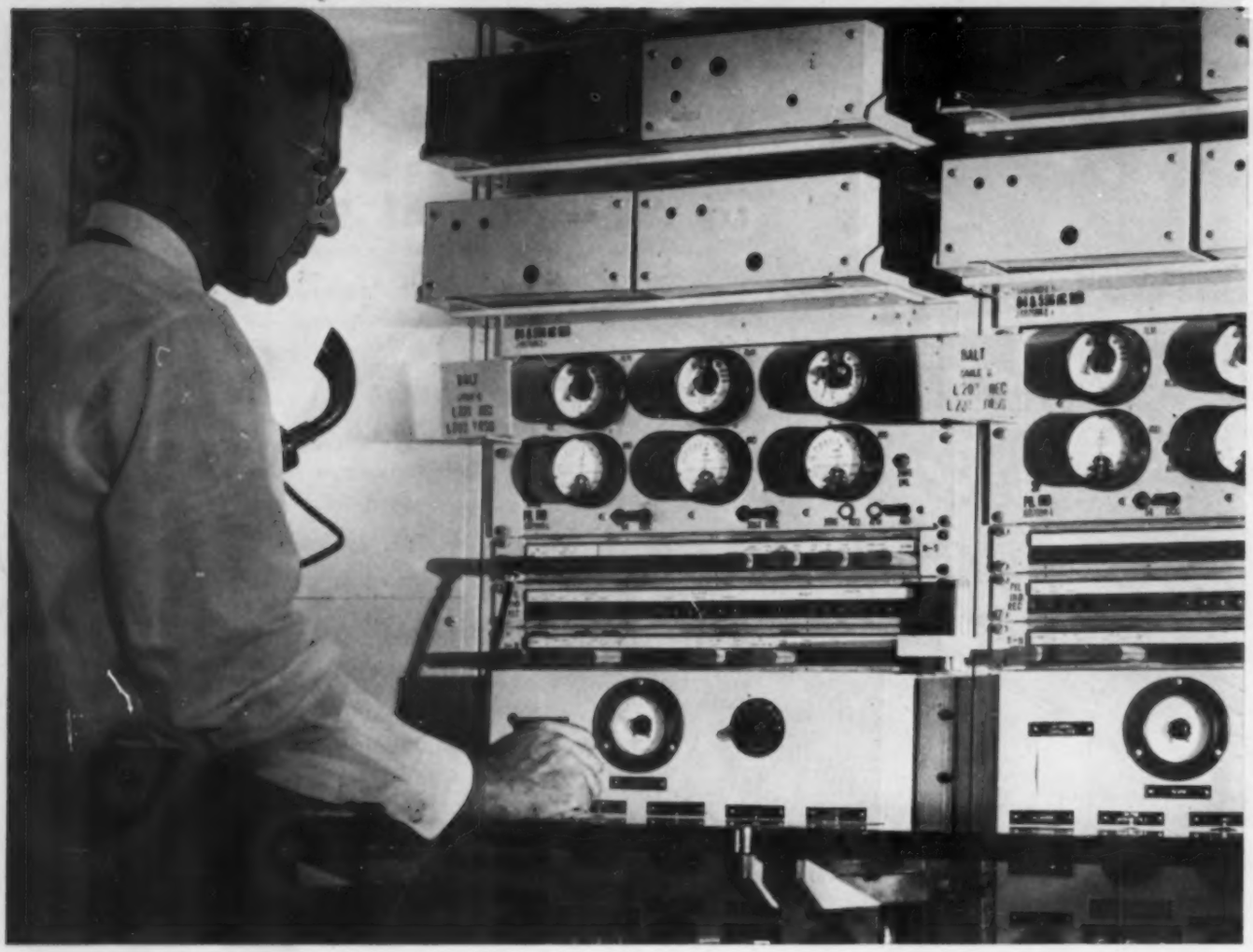
C/A CELLULOSE ACETATE

E/C ETHYL CELLULOSE

Plastics

NIXON NITRATION WORKS • NIXON • NEW JERSEY

Representatives: New York, Chicago, Detroit, St. Louis, Leominster. • *Sales Agents:* NORTHWEST PLASTICS INDUSTRIES: Portland, Oregon; Seattle, Washington
Canadian Distributors: CRYSTAL GLASS AND PLASTICS, LTD., Toronto, Can. • *Export Distributors:* OMNI PRODUCTS CORP., 460 4th Ave., N. Y. 16, N. Y.



At Philadelphia, a testboard man answers as an electronic watchman calls attention to conditions on one of the coaxial systems to Baltimore and Washington.

"Send Help to Manhole 83"

Strung out along every Bell System coaxial cable, electronic watchmen constantly mount guard over your voice. Some are in manholes under city streets; some are in little huts on the desert. Most situations they can deal with; if things threaten to get out of hand, they signal the nearest testboard.

Principal care of the electronic watchman is the transmission level. Sun-warmed cables use up more energy than cold ones, so a transcontinental call may take a millionfold more energy to carry it by day than by night. Each watchman — an electronic regulator — checks the transmission level and adjusts the amplification which sends your voice along to the next point. Many hundreds of regulators may be at work on a single long distance call.

Without automatic regulation, the precise control of energy in the Bell System's long distance circuits would be a superhuman task. So Bell Laboratories, which in 1913 developed the first high vacuum electronic amplifier, went on to devise the means to make them self-regulating in telephone systems. This is one reason why your long distance call goes through clearly, summer or winter.

BELL TELEPHONE LABORATORIES

Exploring and inventing, devising and perfecting for continued improvements and economies in telephone service.

Plumbing fixtures

Washing machine agitators

Automobile instrument panels

IF IT'S A BIG PLASTIC PART... GENERAL AMERICAN CAN BUILD IT BETTER!

Refrigerator door trim

YOUR PRODUCT ?

Impressive battery of the world's largest injection molding presses

General American has the engineering skill, the creative imagination, and the equipment to manufacture large and complex plastic parts.

Waiting to serve you at General American are batteries of large-volume injection molding presses, including the 32-oz. type, and compression presses ranging up to 500-ton, 1000-ton and 2000-ton capacities. That means *volume*—a smooth flow of plastic parts to your production lines.

Submit your plastics problems to us for design, engineering and prompt quotations.

PLASTICS DIVISION

GENERAL AMERICAN TRANSPORTATION
CORPORATION

135 South La Salle Street • Chicago 90, Illinois

AN IMPORTANT NEW DEVELOPMENT IN FINE PACKAGING

UNSURPASSED IN QUALITY

SIGNIFICANTLY LOW IN COST

POLYFLEX SHEETING

MADE OF STYRON

Now—an *economical* new approach to fine packaging: Polyflex Sheeting* made of Styron. Here is real quality for your packaging jobs at a price far below that of any comparable plastic sheeting. It brings you this important economy in a completely new material specially fabricated from Dow Polystyrene. Brilliantly crisp and clear, sheeting made of Styron is light in weight and free from discoloration or other deterioration. Well adapted to standard package fabrication techniques, it withstands without change all normal handling, storage, and display conditions, including exposure to light and temperature changes. For better packaging at lower cost, see your package supplier or get in touch with your nearest Dow office.

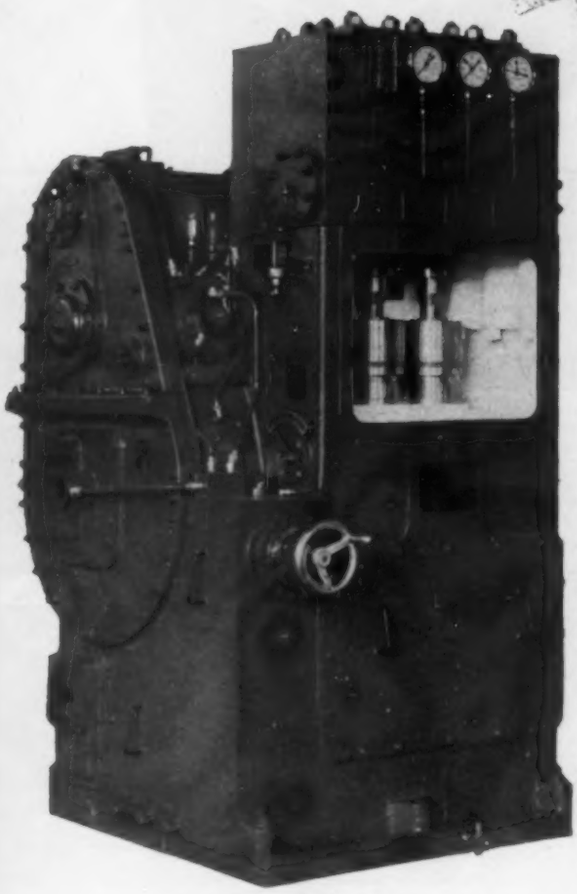
**Polyflex Sheeting made of Styron is a product of Plax Corporation, Hartford, Connecticut.*

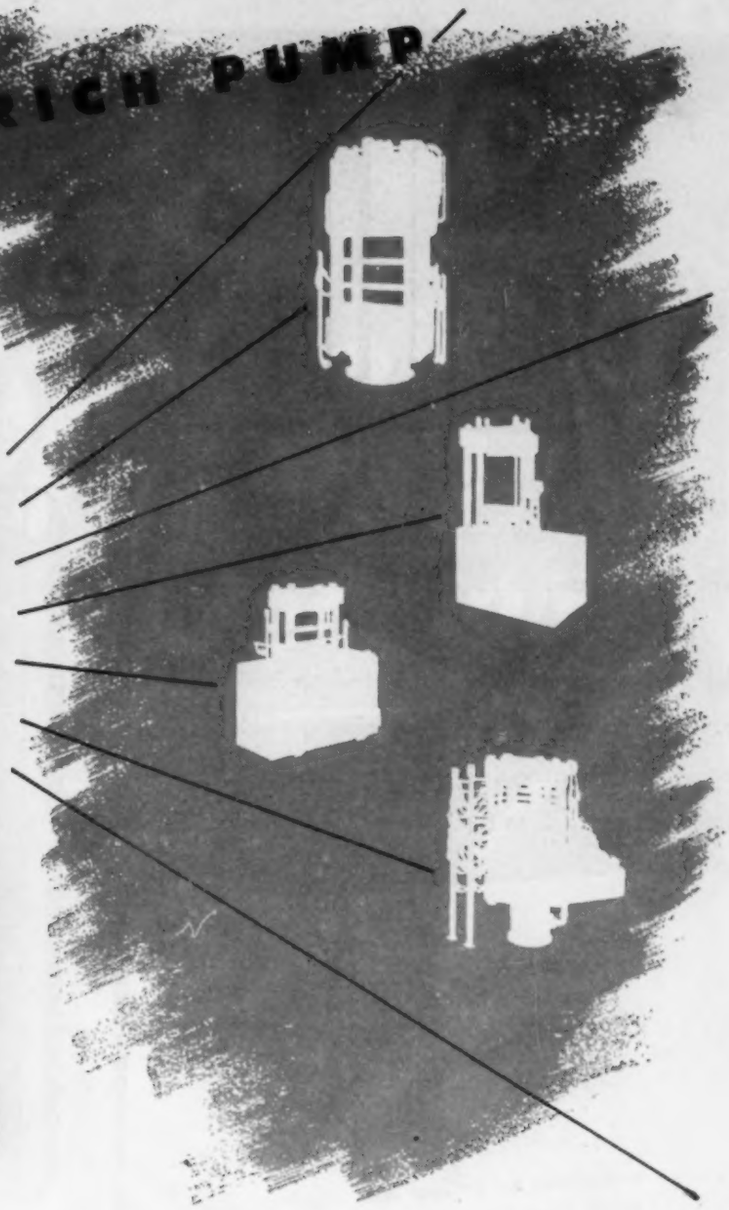
DOW Plastics

PLASTICS DIVISION • THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

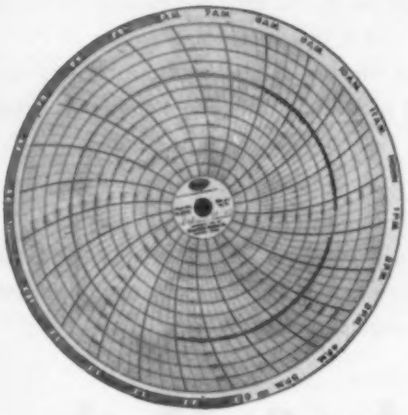
New York • Boston • Philadelphia • Washington • Cleveland • Detroit • Chicago • St. Louis • Houston
San Francisco • Los Angeles • Seattle • Dow Chemical of Canada, Limited, Toronto, Ontario

USE *One* ALDRICH PUMP





For All Your Plastic Molding Presses



With one ALDRICH-GROFF "POWR-SAVR" PUMP, you can provide uniform hydraulic pressures for all your plastic molding presses and obtain the higher efficiency of a centralized hydraulic system at the same time.

The ALDRICH-GROFF "POWR-SAVR", a variable stroke, constant speed, variable capacity pump, will handle any free-flowing liquid—can be automatically controlled to provide stepless, straight-line variation from zero to rated maximum output. Working pressures up to 15,000 psi can be maintained and variance will not exceed 5% of that desired.

Centralize your system—you get compactness, quick accessibility, easy maintenance and greater economy. Write for technical details to—

THE ALDRICH PUMP COMPANY

6 GORDON STREET, ALLENTOWN, PA.

ALDRICH

Representatives: Birmingham • Bolivar, N. Y. • Boston • Chicago • Cincinnati • Cleveland • Denver Detroit • Duluth • Houston • Jacksonville • Los Angeles • New York • Omaha • Philadelphia • Pittsburgh Portland, Ore. • Richmond, Va. • Spokane, Wash. • Syracuse • St. Louis • San Francisco • Seattle • Tulsa

ALDRICH, THE FIRST NAME IN VARIABLE CAPACITY PUMPS

HOW BIG IS A PLASTIC?

It's as big as ingenuity, as large as the markets which are created for its use.

If you're interested in one such new market for plastics materials and parts in which 70% of the firms are already using plastics—with others contemplating their use in the immediate future, here are three fundamental facts on . . .

1. The ways in which this market uses plastics . . .

MOLDED . . .	78.5%	EXTRUDED . .	32.0%
SHEET	58.0%	RAW MATERIAL RESINS . .	30.5%
LAMINATED	52.8%	CAST	22.4%
MACHINED	37.8%		

2. The ways in which it obtains plastics parts . . .

BOUGHT FROM OUTSIDE SOURCES	84%
MADE WITHIN THE COMPANY . . .	31%
BOTH	15%

3. The information most needed by the market . . .

PROPERTIES AND CHARACTERISTICS	75%
SELECTION FACTORS	71%
COSTS	58%
MACHINING AND FINISHING . . .	54%
DESIGN FACTORS	53%
MOLDING, CASTING AND LAMINATING METHODS	46%

This market is the readership of MATERIALS & METHODS magazine, and the above facts are among the many uncovered by M&M in a recent exploration of the viewpoint and thinking of the thousands of engineers, designers and production men who make up its circulation.

The complete story shows you which kind of man is interested in what kind of plastics materials and parts . . . outlines a market for plastics to arouse the interests (and sales imaginations) of every producer of these newest engineering materials.

The coupon (below) will bring you all the facts by return mail.

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

_____

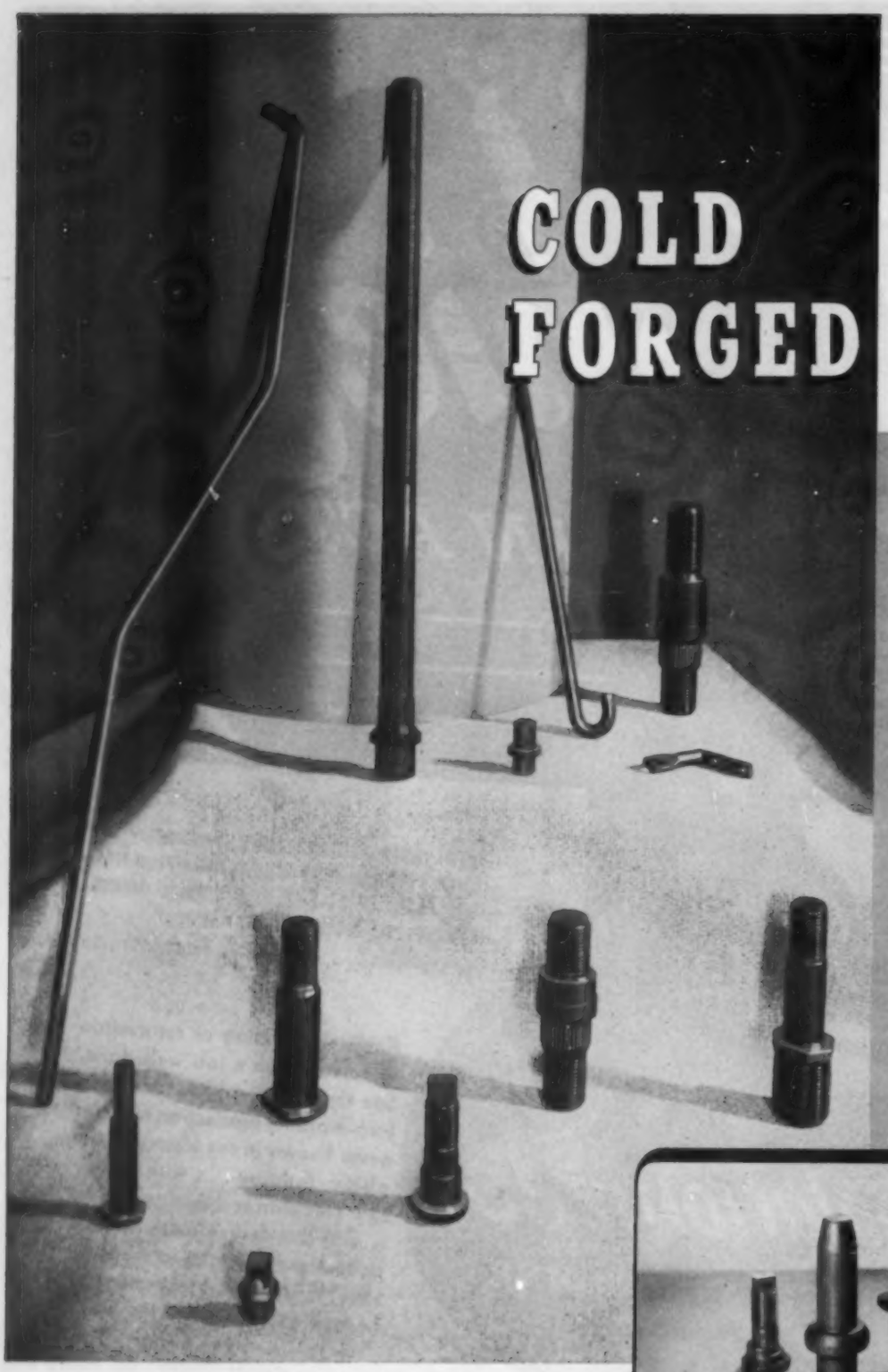
Materials & Methods, 330 W. 42 Street, New York 18, N. Y.

Materials & Methods

REINHOLD PUBLISHING CORPORATION

NEW YORK • CHICAGO • PHILADELPHIA • CLEVELAND • SAN FRANCISCO

Publishers of Metal Industries Catalog, Chemical Engineering Catalog, Progressive Architecture. Advertising Management for American Chemical Society Publications.



COLD FORGED PARTS

Allied's experience in producing cold forged parts is your guarantee of:

- High volume production at low cost
- Tolerances as close as are required for most machined parts
- Strength and durability
- "On time" delivery

Quotations figured from your part prints will be submitted promptly.

ALLIED CORPORATION PRODUCTS — PRECISION · EXPERIENCE · DEPENDABILITY

ALLIED PRODUCTS CORPORATION
DEPARTMENT 35

SPECIAL COLD FORGED PARTS • STANDARD CAP SCREWS • HARDENED AND PRECISION GROUND PARTS
SHEET METAL DIES FROM THE LARGEST TO THE SMALLEST • JIGS • FIXTURES • STEAM-HEATED PLASTIC MOLDS
SPECIAL PRODUCTION TOOLS • R-B INTERCHANGEABLE PUNCHES AND DIES • DIE MAKERS' SUPPLIES

RESINOX 7934 makes good connections

Developed by Bell Telephone Laboratories' engineers, these small 15 contact connectors do big jobs in electronics. Molded of Resinox 7934, they stand up in operation under wide temperature ranges and meet operating voltages up to 500 volts a.c.

Because they must meet the most exacting electrical and mechanical specifications, special qualities are demanded of the plastic chosen for these units. Resinox 7934, a mica filled compound based on a new phenol formaldehyde resin evolved by Monsanto, meets these demands with these outstanding superiorities:

Resinox: Reg. U. S. Pat. Off.

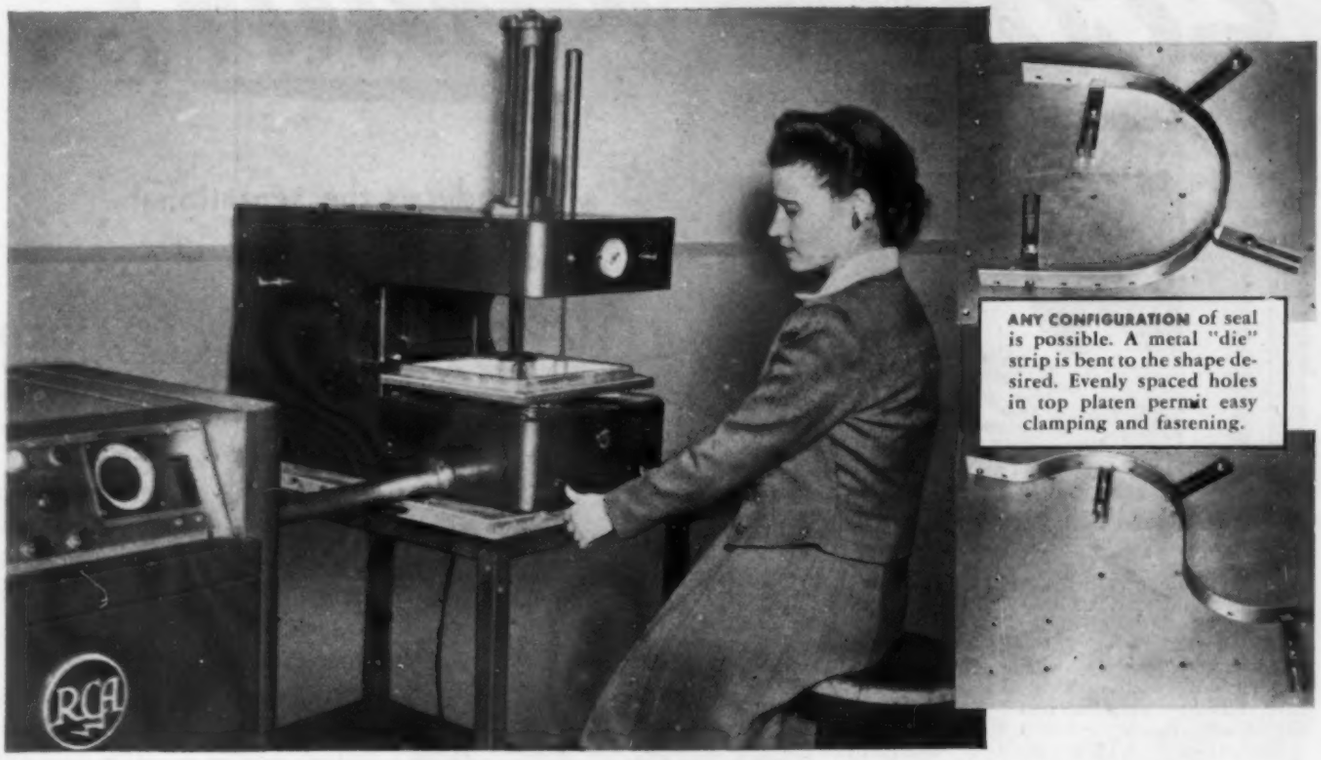
1. Low dielectric constant and power factor
2. Low water absorption
3. High heat resistance
4. Ease and economy in molding

These same advantages are available to molders of all types of electrical apparatus. Get full information and technical data from: MONSANTO CHEMICAL COMPANY, Plastics Division, Springfield 2, Mass. In Canada: Monsanto (Canada) Limited, Montreal.

MONSANTO
CHEMICALS AND PLASTICS

SERVING INDUSTRY... WHICH SERVES MANKIND

NEW...A TRULY UNIVERSAL ELECTRONIC SEALER BY RCA



ANY CONFIGURATION of seal is possible. A metal "die" strip is bent to the shape desired. Evenly spaced holes in top platen permit easy clamping and fastening.

Makes any shape of seal in thermoplastics without the need of expensive dies

THIS IS IT! . . . a truly versatile sealer for thermoplastics. Seals plastic balls, pocketbooks, belts, or what have you . . . replaces solvents, cements, sewing machines, and heat-conduction methods.

You get electronic heating at its best—plus greater manufacturing diversity and lower cost. Even so-called "special" jobs can be put on a profitable "push-button" basis.

In concept, this machine's design is surprisingly simple. Gone is the need for expensive die shoes and costly time-consuming arrangements. A brass, copper, or steel strip serves as the die material. Bend it to whatever shape you want. Clamp it to the top platen and you are ready to go. To change "dies," replace the strip with the new shape desired. A stock of the "dies" you need can be easily made and interchanged at will.

When powered by an RCA 2-BH Electronic Generator, or similar high-frequency equipment, this sealer is capable of making "one-shot" seals having an area of from 7 to 15 square inches in from one to four seconds, depending upon the thickness of the material. The air cylinder, which drives the top platen, supplies sufficient pressure to seal 196 square inches (total platen area) if needed.

A ball-bearing coupling device permits the top platen to "float" and assures perfect contact with the work. Uniform pressure over the entire seal area is maintained; hot spots are eliminated.

Normally, the material to be sealed is placed directly on the lower platen. To speed loading and alignment—and to eliminate guide pins and key slots—copper-bottom trays can be easily made to hold the work. In the latter case the copper acts as an "electrode" surface.

This new RCA universal electronic sealer offers you a real opportunity to simplify your heat-sealing operations . . . boost production, slash costs. We'll be glad to send you complete "specs." Write Dept. 55-I.

INDUSTRIAL ELECTRONICS

RADIO CORPORATION of AMERICA

ENGINEERING PRODUCTS DEPARTMENT, CAMDEN, N.J.

In Canada: RCA VICTOR Company Limited, Montreal

INJECTION AND EXTRUSION DIVISION OF CELLUPLASTIC

SCORES AGAIN!

The housewife attaches the "moth snuffocater," places the cleaner in the closet, closes the door. Inside the "snuffocater," rapidly swirling air sets moth crystals into dancing motion, disintegrates them, releases powerful vapor which kills moths and larvae.

Produces the sensational "Moth Snuffocater" for the new LEWYT VACUUM CLEANER

The Lewyt Company's revolutionary new vacuum cleaner was nearing completion—a cleaner that, in addition to many other outstanding features, would have a special attachment for killing moths and larvae. The production timetable called for design, manufacture and delivery of this attachment, in quantity, in record time. Besides, this "moth snuffocater" would have to be light in weight, shatterproof, transparent, French Blue—and inexpensive.

Quickly but thoroughly, Lewyt investigated sources of supply—and decided upon Celluplastic, plastics specialists since 1919.

Celluplastic engineered and produced *exactly* what was wanted—*on time!* ... To solve *your* injection or extrusion molding problems, however difficult, *consult Celluplastic.* Injection molding up to 22-ounce capacity.

Extrusion molding—flexible and rigid—all thermoplastics—special and standard shapes.

AMERICA'S #1 SOURCE FOR PLASTIC CONTAINERS

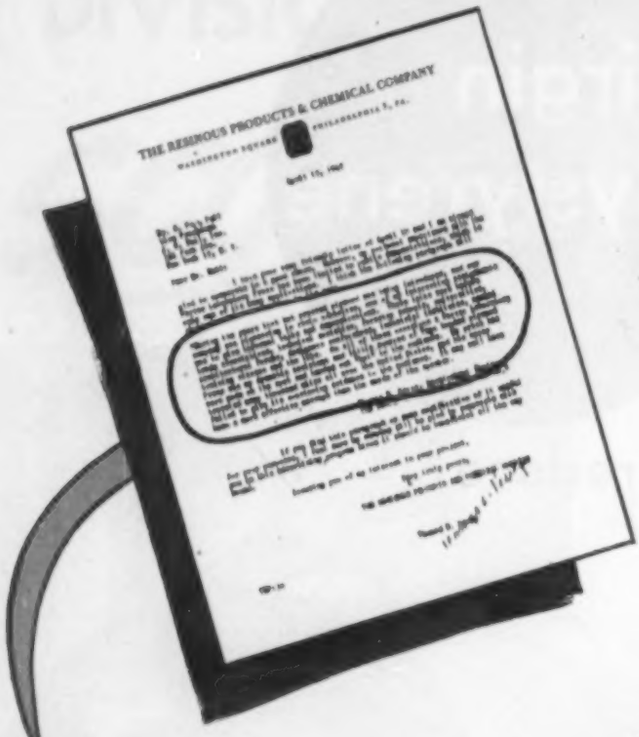
Celluplastic Corporation

50 AVENUE L, NEWARK 5, N. J.

PLASTIC CONTAINERS and PLASTIC PRODUCTS

New York Office: *Rockefeller Center, 630 Fifth Ave., Circle 6-2425* • West Coast: *Container Service Co., Los Angeles 27, Cal.*

THE CARVER LABORATORY PRESS



CLP's in Use

"During the years that hot pressed plywood was being introduced, and our company was pioneering in resin adhesives, one of my interesting assignments was to give informal talks and demonstrations. These talks were before trade associations, technical societies, forestry schools, universities, architectural forums, designers' conferences, industrial institutes, etc. On all these occasions a Carver Laboratory Press was my dramatic assistant and little squares of Tego bonded plywood were made on the spot and handed out "hot" to the audience. My press has traveled many thousand miles all over the United States, and it has never failed to give its convincing evidence to the audience."

(signed) Thomas D. Perry, Development Engineer
THE RESINOUS PRODUCTS & CHEMICAL CO.

STANDARD FOR RESEARCH AND DEVELOPMENT

The Carver Laboratory Press is in constant use by plastics engineers, chemists and laboratory technicians for: development, research and instruction work; testing single cavity molds, preparation of samples, etc. The Carver Press is a complete, self-contained hydraulic unit. Accurately controlled pressures to 20,000 lbs.; 6-inch gauge is rigidly mounted on base. Carver Standard Accessories include Electric or Steam Hot Plates, Carver Test Cylinders, Swivel Bearing Plates, Cage Equipment. Available from stock. Write for catalog.

FRED S. CARVER INC.
HYDRAULIC EQUIPMENT
343 HUDSON ST. NEW YORK 14, N. Y.

Fuller Brush restyles with Acetate

Brushes molded by Fuller Brush Company from cellulose acetate supplied by Chemaco Corporation. Brushes designed by J. Gordon Lippincott.

IN RESTYLING its line of personal brushes Fuller Brush Company chose cellulose acetate plastics above all other materials. Many requirements had to be met by the plastics selected for this important application.

First, the materials had to be extremely tough and resistant to shattering—to withstand the high-speed drilling of holes and the impact of stapling the bristles during manufacture.

These properties, plus good dimensional stability, were essential service requirements, too—in order to obviate loosening of the bristles or cracking of the handles under varying climatic conditions. Other plastics tested did not possess these desirable properties.

Secondly, the plastics had to be moldable to close dimensions and adaptable to the high speed injection process—so as to faithfully reproduce the new designs with the least finishing, and to meet mass-production demands rapidly.

Finally, from a consumer standpoint, the materials selected had to be light in weight; pleasant to the touch; resistant to soap, hot water, and toilet preparations; and obtainable in hues that would have universal eye-appeal.

In meeting all these needs for Fuller Brush Company, cellulose acetate again demonstrates how high quality styling and unusual durability can be combined with maximum economy.

If *you* have a restyling problem, investigate the cellulosics. While Hercules does not make cellulosic plastics or molding powder, we will be glad to send you helpful technical literature on the Hercules base materials from which they are made.

HERCULES POWDER COMPANY
INCORPORATED
916 Market Street, Wilmington 99, Delaware

CP7-10

Save and Sell with Cellulosic Plastics

CELLULOSE ACETATE • ETHYL CELLULOSE • NITROCELLULOSE

LOOKING FOR IDEAS *In Plastics?*

If you are interested in the many new and fascinating things that are being done with plastics, you should subscribe to MODERN PLASTICS MAGAZINE; for this magazine is the leading publication in the plastics industry. It is colorful, profusely illustrated and averages more than 286 pages every single month.

MODERN PLASTICS is jam-packed with ideas that penetrate practically all industries with suggested uses, processing methods and plastic materials. This magazine is the real authority on the latest developments, techniques and processes. It points out how plastics can do jobs better with plastics, can increase sales, how plastics can save raw material costs, how plastics open up new markets and how plastics will do jobs that cannot be duplicated by any other material.

MODERN PLASTICS is available to you at a low cost. Imagine reviewing 286 pages jam-packed with ideas for less than 50c every month. On a 2-year basis you can get this volume of ideas every month for less than 30c. You cannot afford not to read MODERN PLASTICS if you want to keep informed on the many new and exciting developments in this industry.

4 MAGAZINES IN ONE

THE GENERAL SECTION —
carries stories of new applications, materials, theories of design, selling and merchandising. It is full of ideas for adapting plastics for entirely new purposes.

TECHNICAL SECTION —
for the advanced engineer or chemist who wants to know the chemistry, techniques, formulae of many new or improved materials. Written by authorities in the field of chemistry.

PLASTICS ENGINEERING SECTION —
explores new production methods, analyzes costs, tells how to set up new production schedules and explains new and improved processing or fabrication operations.

NEWS AND FEATURES —
contains latest news of the industry itself, illustrates new plastics products, books, machinery and equipment. Lists stock molds and products therefrom.

MAIL YOUR SUBSCRIPTION NOW

Modern Plastics Magazine
122 East 42nd Street, New York 17, N. Y.

Gentlemen:

I would like to keep up with the many new developments in plastics. Please start my subscription immediately. I would like to subscribe for one year at ☐ $5.00; two years at ☐ $8.00. (Foreign: $6.00 for 1 year, $10.00 for 2 years. Canadian: $5.50 for 1 year, $9.00 for 2 years.) ☐ Please send me more information about the MODERN PLASTICS MAGAZINE.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

Your Position _____

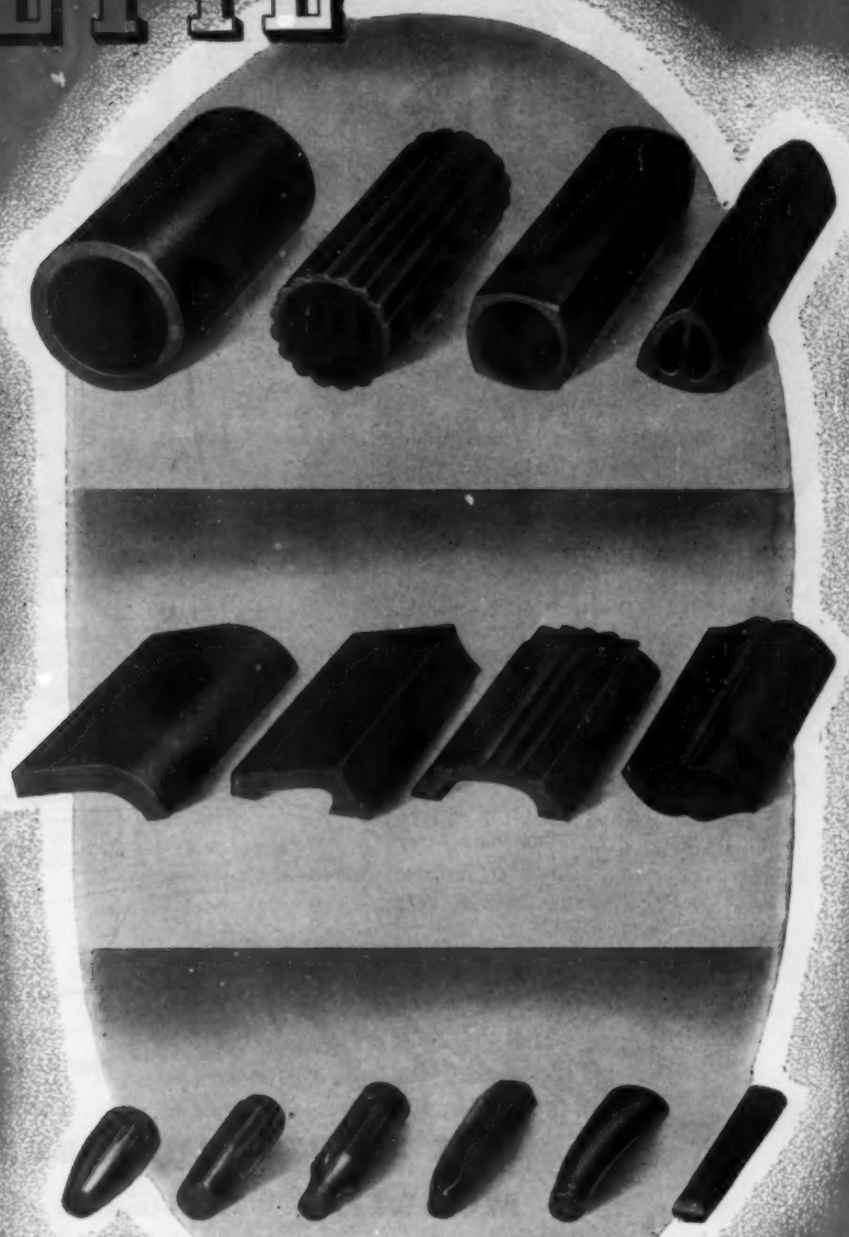
47 MPK-S

MODERN PLASTICS
MAGAZINE

122 East 42nd Street • New York 17, N. Y.

A CAST PHENOLIC RESIN OF EXCEPTIONAL QUALITIES

MARBLETTE



Outstanding among plastics, Marblette has a jewel-like depth and a complete color range which duplicates the appearance of precious stones, tortoise shell and ivory.

Its almost infinite variety of colors is available in transparent, translucent, opaque, or in mottled effects. Marblette also comes in a water clear form known as "Crystle" in a wide choice of colors.

Marblette's machining characteristics, resistance to oils and acids, non-inflammability and exciting beauty make it ideal for countless manufacturing needs.

MARBLETTE will help plan your world of tomorrow. The Marblette staff of engineers offers its services to help with your manufacturing problems. Write to us outlining your needs.

SPECIAL CASTINGS

Marblette is supplied in sheets, rods, tubes, and special castings such as cutlery handles, kitchen utensil handles, pipe stems, cigarette holders, clock cases, automotive trimmings, jewelry items, buckles, etc. Special shapes made to customer's specifications can be supplied provided draft is all one way.

THE MARBLETTE CORPORATION

Manufacturers of Phenolic Resins since 1929

37-21 THIRTIETH ST., LONG ISLAND CITY 1, N. Y.

10% to 14% More Capacity

IN POUNDS PER HOUR

MODEL 18-2

Speed-Flo

FOR MORE PROFITABLE MOLDING

- ★ Fellows-Leominster engineered molding machines, precision-built for sustained full-load performance.
- ★ Automatic cycling push button controls, safety-interlocked for trouble-free functioning.
- ★ Variable injection pressure, with control easily accessible at operator's position.
- ★ Selective control, also, over speed of mold closing.
- ★ Centralized die-closing adjustment for minimizing flash.

Heart of Pace-Setting Performance

The Fellows-Leominster SPEED-FLO Cylinder with TAPER-TITE Separator

A revolutionary design-advance in the most vital element of Injection Molding Machine operation...A TAPER BORE SPEED-FLO CYLINDER, and SEPARATOR.

• WATTAGE SAVED...15%

The SPEED-FLO design, together with the arrangement of the heating units to meet a new balancing of the heat demand, permits a reduction in electrical heat wattage input by 15%—over previous designs.

• BETTER HEAT DISTRIBUTION

The larger mass of the separator and its wider "fins" at the rear end, store and distribute maximum heat needed to speed up th plasticizing of the granular material where it enters the cylinder "cold". Also, the reduction in the cross-section of the flutes toward the small end of the separator is proportional to the reduction in volume of the material from a granulated to a plasticized condition.

• BURNING and DISCOLORATION MINIMIZED

The "TAPER-TITE" Separator, in operation, fits the lap-finished bore of the cylinder so tightly that no material can lodge between the top of the "fins" and the cylinder wall. Hence, danger of lodged material which might become burned is avoided. Consequently, the principal hazard of discoloring the molded article is banished.

• GREATLY INCREASED OUTPUT

The SPEED-FLO Cylinder and "TAPER-TITE" Separator represent the greatest improvement in Injection Molding Machines in a decade. Fellows-Leominster machines of this design increase production over previous models by from 10% to 14%.

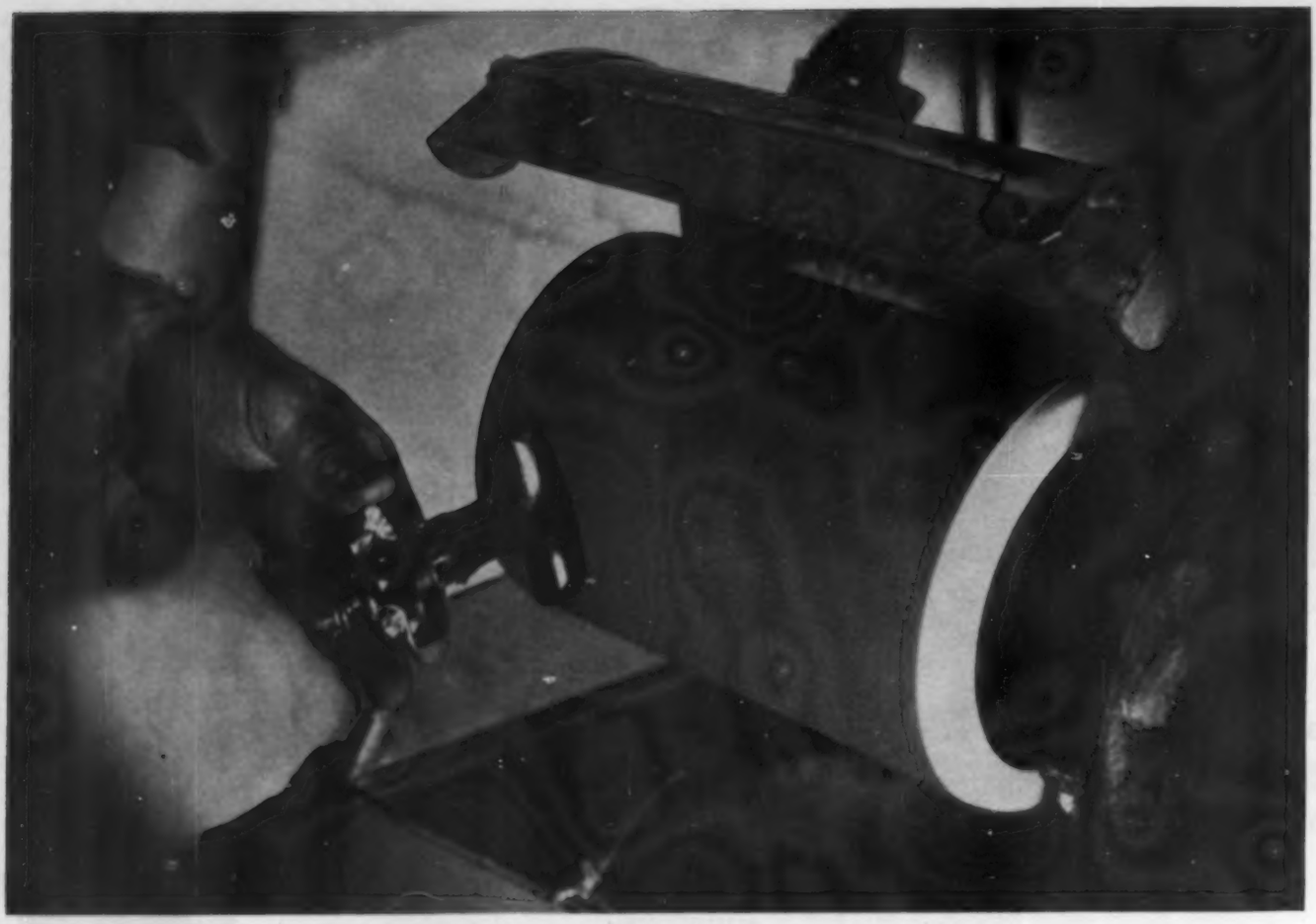
Think what this means in daily profit to the user.

For details, write: The Fellows Gear Shaper Company, Plastics Machine Division, Head Office and Export Dept., Springfield, Vermont. Branch Offices: 616 Fisher Bldg., Detroit 2, 640 West Town Office Bldg., Chicago 12, 7706 Empire State Bldg., New York. New England Distributor: Leominster Tool Company, Leominster, Mass.

Fellows

LEOMINSTER

injection molding equipment



FOR ALL SANDING—ON ALL PLASTICS . . .
ONE WORD—*DURITE*

It's as simple as that! For sanding dry, it's Durite; for sanding wet, it's Speed-wet Durite. But dry or wet, it's one word — Durite.

The rigid plastics are all hard, horn-like substances, and whether thermosetting or thermoplastic, they require a hard, sharp abrasive. Next to the diamond itself, silicon carbide, electric furnace abrasive, is the hardest and sharpest cutting agent. Durite abrasive belts are coated with silicon carbide grain — glue bonded for dry sanding — resin bonded (Speed-wet) for wet sanding.

Removal of gates and flashes and restoration of true mold lustre are "necessary evils" of mold design. They must be done as "painlessly" as possible. Durite belts have the speed and cut to finish plastics just that way — fast, clean and cost-minus.

For the complete story on finishing plastics, write for your copy of "Coated Abrasives in the Plastic Industry."

BEHR-MANNING • TROY, N. Y.

(DIVISION OF NORTON COMPANY)

Photo courtesy Tech-Art Plastics

Give 'em both barrels . . .

There's no half-way cooperation when your products are scheduled for production at Michigan Molded Plastics. The Michigan men, from the boss down, really give 'em both barrels so that they are turned out *right*, and *right on time*. Michigan Molded has so arranged its production that maximum efficiency is attained, and so that production promises are met — your product requirement will have considerable attention. So whether they're extruded, molded or injected, let Michigan Molded do the job. No use hunting farther — Michigan Molded Plastics has 25 years' experience and the finest modern production facilities.

MICHIGAN MOLDED PLASTICS, INC.

Dexter Michigan

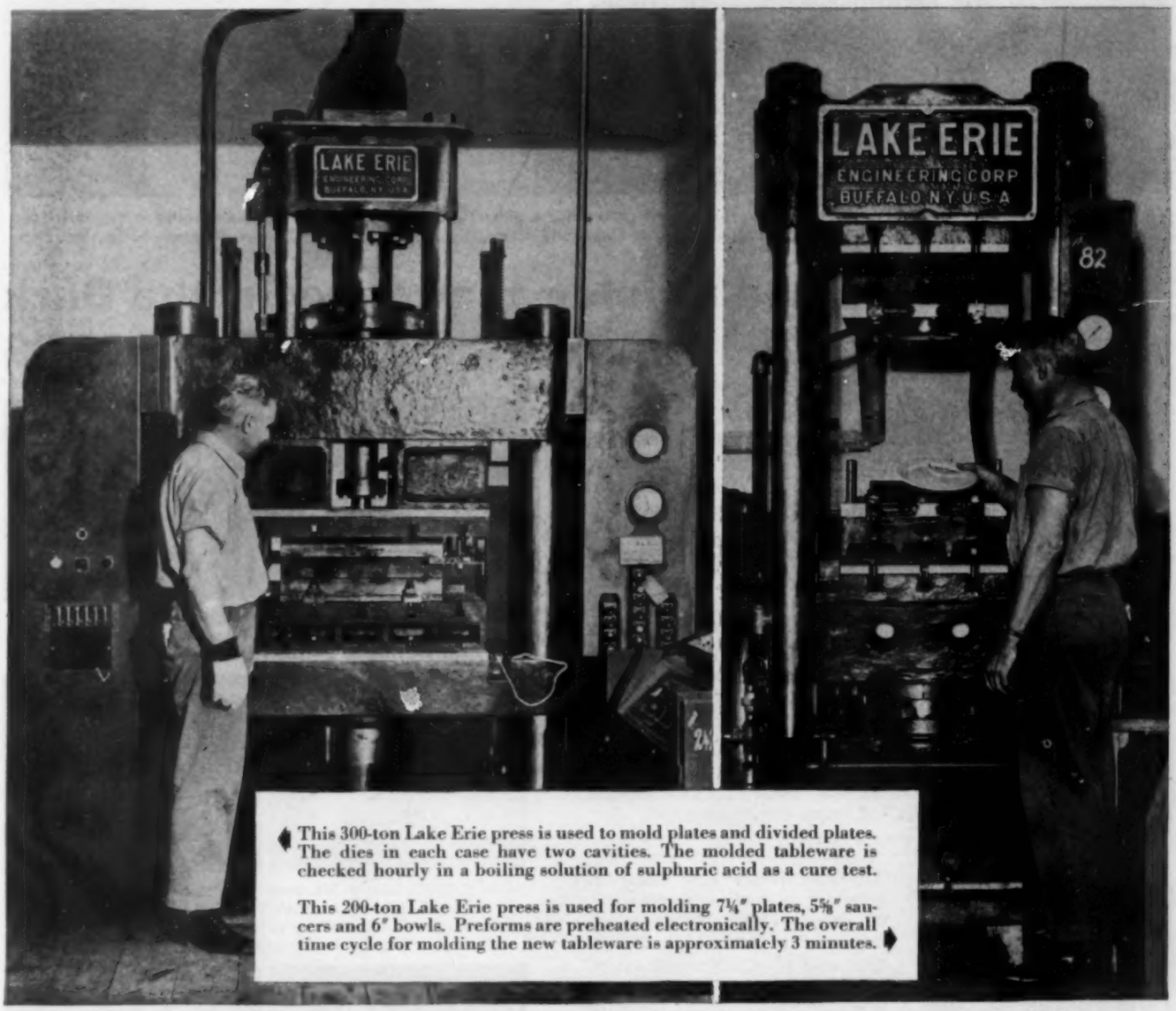
This Superb Plastics

Plastics Manufacturing Company's new line of tableware includes plates, divided plates, saucers and several sizes of bowls. The divided plate illustrated weighs ¾ pound. A china plate of the same design and size weighs over 2 pounds.

Three sections of this semi-automatic, multiple-unit Lake Erie press are used for molding tableware. The fourth unit of the press is used to produce preforms of the rag-filled or flock-filled Melamine.

THE Plastics Manufacturing Company of Dallas, Texas has developed a new line of tableware that is said to be the finest ever produced from plastics. It has a beautifully colored lustrous finish, is lighter than china but far sturdier than previous types of plastic tableware, and is highly resistant to scratching and breaking. The tableware is molded in three types of Melamine—alpha-filled, rag-filled and flock-filled. Molding is accomplished on three types of Lake Erie Hydraulic Presses—40-ton multiple-unit, 200-ton compression and 300-ton downstroke duplex.

Tableware is molded on LAKE ERIE Hydraulic Presses



This 300-ton Lake Erie press is used to mold plates and divided plates. The dies in each case have two cavities. The molded tableware is checked hourly in a boiling solution of sulphuric acid as a cure test.

This 200-ton Lake Erie press is used for molding 7¼" plates, 5⅝" saucers and 6" bowls. Preforms are preheated electronically. The overall time cycle for molding the new tableware is approximately 3 minutes.

● Leading manufacturer of hydraulic presses—all sizes and types—plastics molding . . . metal working . . . forging . . . metal extrusion . . . processing . . . rubber vulcanizing . . . stereotyping . . . special purpose.

LAKE ERIE
ENGINEERING CORP.
BUFFALO, N.Y. U.S.A.

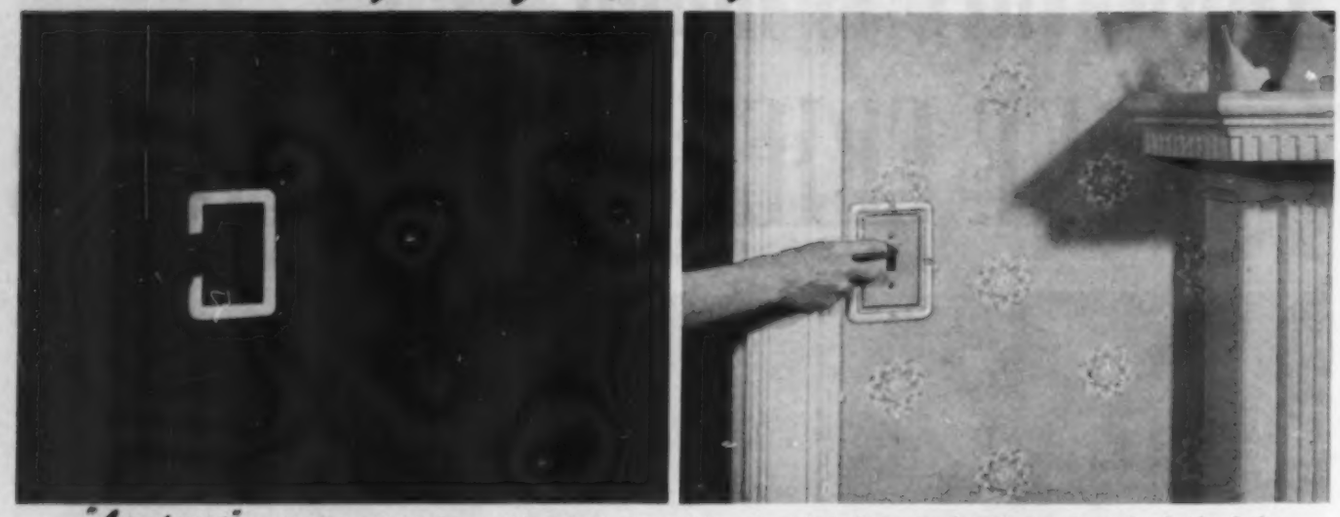
LAKE ERIE ENGINEERING CORP.
MANUFACTURERS OF
HYDRAULIC PRESSES AND SPECIAL MACHINERY
General Offices and Plant:
868 Woodward Avenue, Buffalo 17, New York

★

FELLER ENGINEERING DIVISION
SPECIALISTS—EXTRUSION AND
FORGING PRESSES
1100 Empire Building, Pittsburgh 22, Pennsylvania

OFFICES IN PRINCIPAL CITIES AND FOREIGN COUNTRIES

NO *Fumbling*-NO *Groping*-THEY'RE EASY TO FIND!



"Luminous" wall plate shields frame this switch plate with a *glow* that eliminates fumbling and groping in the dark for the switch. Molded of phosphorescent polystyrene (Lustron) from Monsanto Chemical Co. for Madison Mills, Inc.

Switch Plates and Shields that *Glow* in the Dark Add to Safety—Convenience—and *Increase* SALES

"Luminous" plastic switch plates and shields absorb and store up daylight or lamplight energy, and then emit the stored-up energy during the dark hours of the night. This "luminous" glow is visible all night to eyes that are dark-adapted. The "glowing" switch is located quickly and *without fumbling or groping*, thus adding to safety at night as well as to the convenience of modern living.

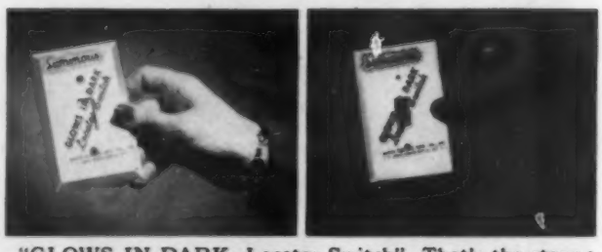
Many useful applications for "luminous" plastics are now appearing on the markets—"luminous" clocks (cases, dials, hands), flashlights, lamps and lampshades, fish lures, electric light pulls and safety signs (for hotels, hospitals, factories, theaters, night clubs, and other public buildings). Other applications include door and cabinet "hardware," table tops, house numbers, toys, gifts, and novelties. These and other suggestions for luminescent applications are included in our booklet "101 Useful Luminescent Applications." A copy on request.

*Reg. U.S. Pat. Off.

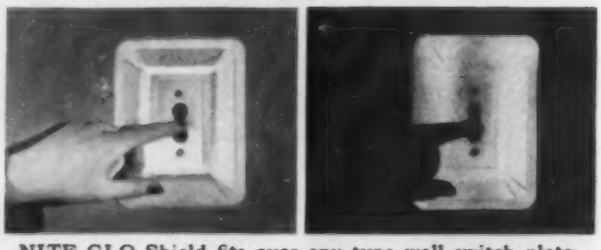
HORSE HEAD PRODUCTS New Jersey Zinc

The New Jersey Zinc Company does not manufacture plastics—we supply Horse Head* Luminescent Pigments (both fluorescent and phosphorescent types) to plastic manufacturers who produce luminescent molding granules and powders, cast and calendered films, laminating and tubing materials. Names of suppliers on request.

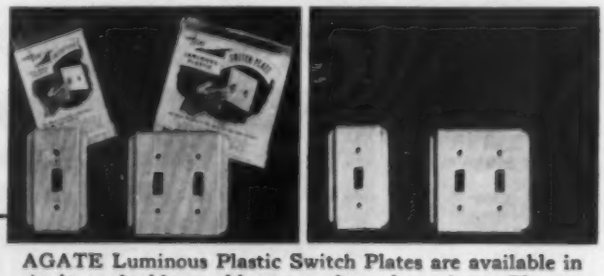
THE NEW JERSEY ZINC CO.
160 FRONT STREET • NEW YORK 7, N. Y.



"GLOWS IN DARK—Locates Switch"—That's the story the Eagle Electric Mfg. Co., Inc. print on the wrapper for their Luminous Switch Plate.



NITE-GLO Shield fits over any type wall switch plate. It keeps walls free from dirt and is visible in the dark. It is made "luminous" by painting reverse side of formed acetate sheeting by the Plastext Co.



AGATE Luminous Plastic Switch Plates are available in single or double tumbler type plates from Agate Plastics Co., for whom they are molded from polystyrene by American Phenolic Corporation.

It's* Horse Head* Luminescent Pigments *that MAKE these Plastics "Glow"

Adding Beauty to Utility in the modern car's ensemble — with ERIE RESISTOR *custom molded plastics*

In the keen competition for after-war customers, with performance so closely matching performance, alert automobile manufacturers are paying increased attention to the little spots of beauty that add so much to attractiveness while adding little or nothing to cost. Naturally, Erie Resistor, pioneer in injection custom molded plastics, is in the forefront in its cooperation with car builders; in the production of parts as designed by the manufacturer; in suggesting changes in design for improvement of the finished product or for its more efficient production; and in suggesting parts that can be made of plastics, with increased economy, or utility, or beauty, or all three.

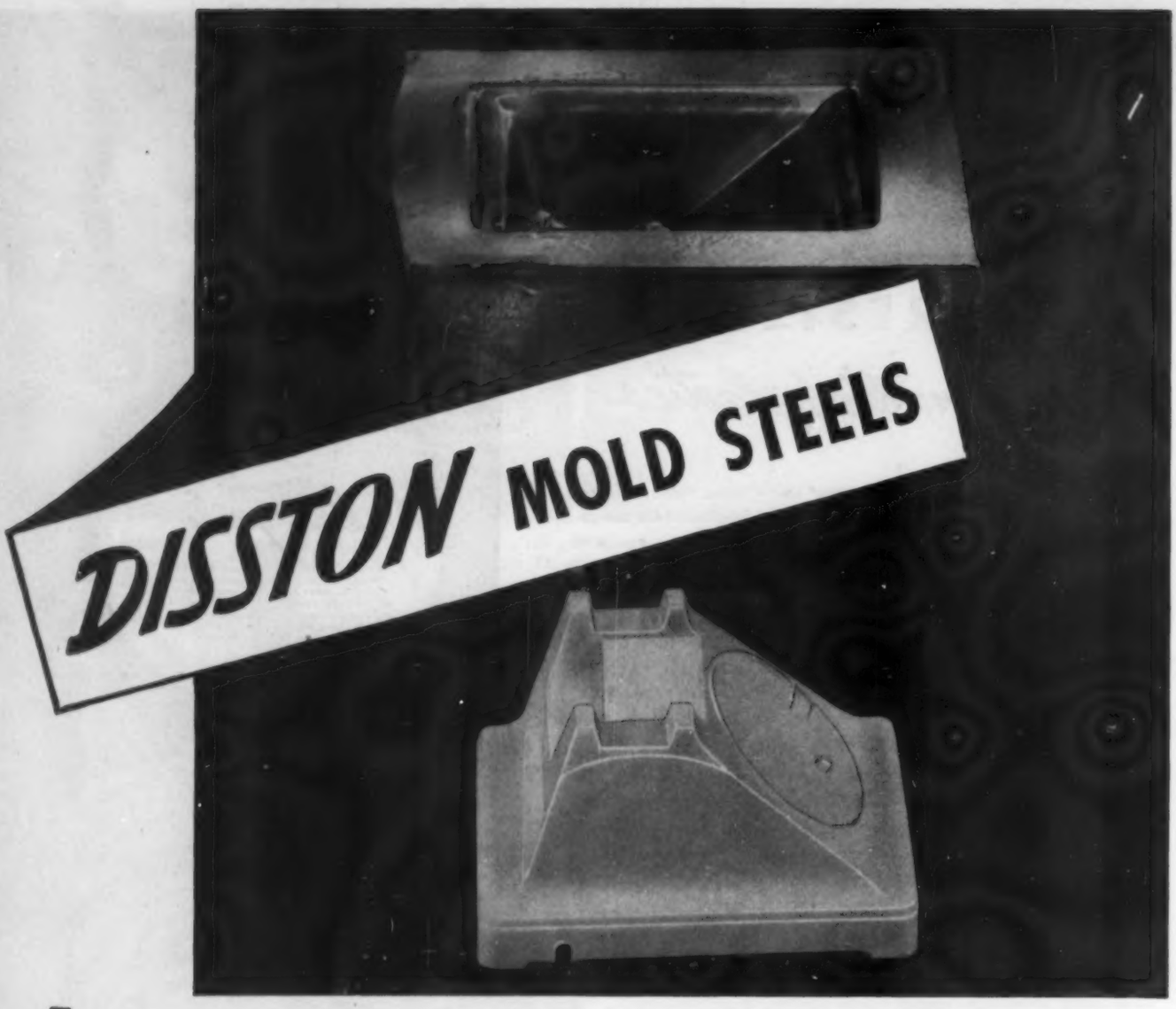
Manufacturers in other fields, too, making everything from cosmetics to washing machines, are turning to Erie Resistor for help in package and parts design and molding; for the achievement of a sales appeal that begins with the dealer's store, and lasts for the life of the product.

Whether your thinking has arrived only at the stage of wondering whether plastics may be the answer, or of complete specifications of what you want, don't hesitate to write.

Plastics Division

ERIE RESISTOR CORP., ERIE, PA.

LONDON, ENGLAND • • TORONTO, CANADA



FOR EASY HOBBING OR MACHINING . . . FOR SMOOTH, CLEAN CAVITIES

● Disston specializes in three different types of mold steels, which meet practically all requirements. They are made of carefully selected raw materials in electric furnaces by modern steel practice with every process under rigid control. All are melted and hot-worked with great care, and are thoroughly inspected to assure freedom from porosity and inclusions. Each is uniformly sound, carburizes evenly and produces unusually smooth cavities.

DISSTON PLASTIRON is a low carbon iron that withstands extreme hobbing. Recommended for difficult shapes and short runs.

DISSTON PLASTALLOY is a low carbon steel containing sufficient nickel and chrome to assure great core strength and resistance to wear, yet permit easy hobbing. Recommended for medium runs.

DISSTON PLASTIKUT is a "cut mold" steel with alloy content for maximum core and case strength. Because of its hardness, Plastikut must be machined instead of hobbed. But its ability to stand up under long runs makes its use economical.

Write for folder which tells what to look for and what to avoid in selecting mold and hob steels. Also contains analyses of Disston Mold and Hob Steels and other information.

Disston metallurgists and engineers will be glad to help you in finding the solution of your mold and hob problems.

HENRY DISSTON & SONS, INC., 934 Tacony, Philadelphia 35, Pa., U. S. A.

DISTRIBUTORS

NEW ENGLAND
Achorn Steel Company
381 Congress St., Boston 10, Mass.

METROPOLITAN NEW YORK AND NORTHERN NEW JERSEY
Bright Steel Corporation, Offices and Warehouses, 528-540 West 22nd St., New York 11, N. Y. and 224-236 Culver Ave., Jersey City 5, N. J.

STEEL: Everybody who wants to obtain steel can help himself to get it by immediately starting scrap into the channels that serve steel mills.

A RAINBOW OF COLORS

that has a Pot of Gold for you!

● The pot of gold at the end of the rainbow is no myth when the rainbow is new, colorful *Resproid.* Available in a brilliant array of jewel-like colors and pastel shades, this versatile vinyl plastic is making profits for manufacturers in a whole range of products with its beauty and practicality.

Resproid comes in light-but-strong plastic films that are ideal for waterproof garments, shower curtains, aprons, baby pants—in distinctive leather and reptile grains that make smart, practical handbags, carrying cases, luggage—in heavier films and plastic coated fabrics that are a "natural" for upholstery because surface dirt can be wiped off in seconds with just a damp cloth.

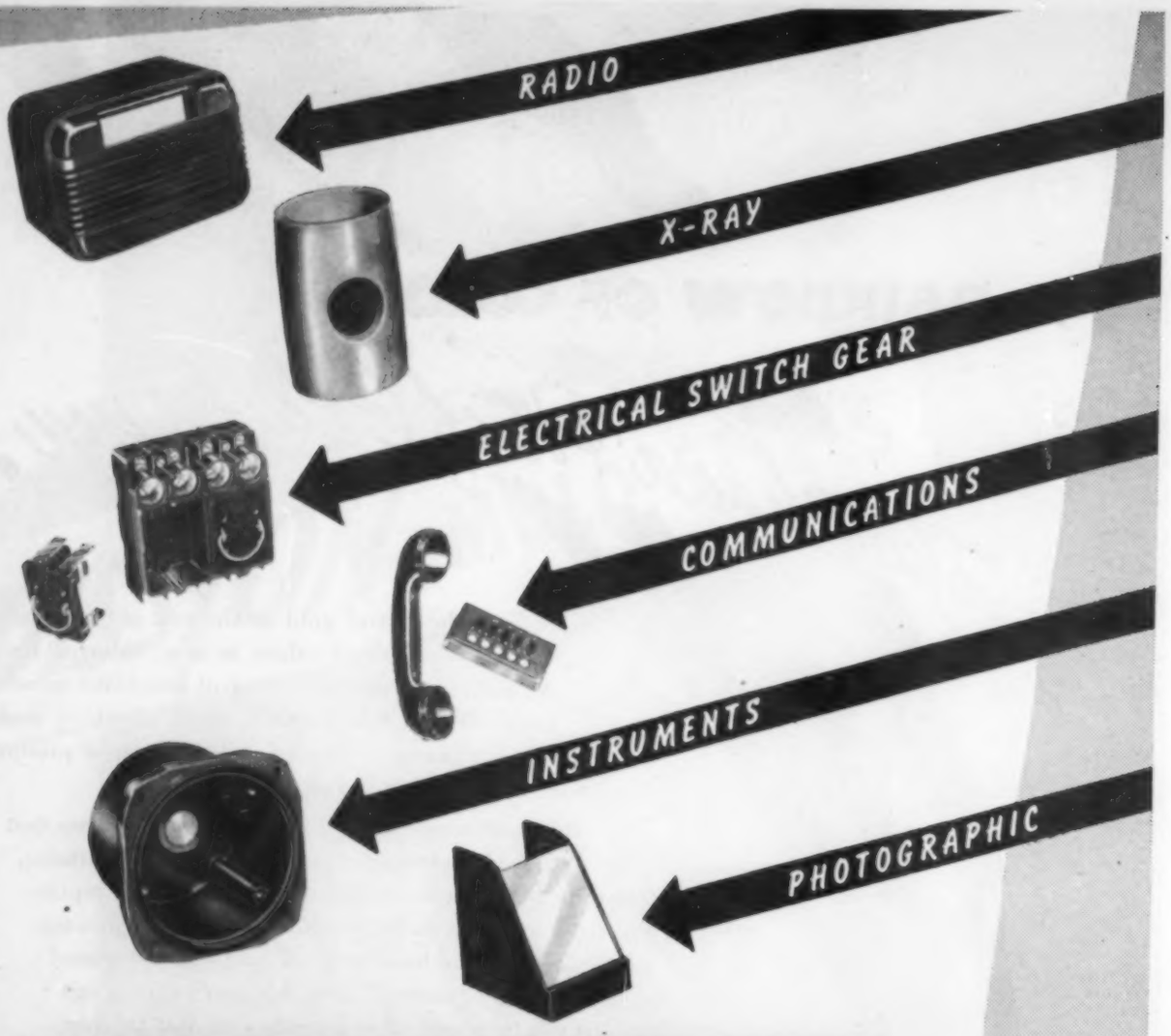
Add *Resproid's* practical indestructibility in everyday use—its resistance to cracking, fading, scuffing and abrasion, to perspiration, most acids and alkalies—and you'll see its great profit possibilities for you.

Whether you're looking for new products to make or new ways to improve your present lines, *Resproid* offers you a whale of an opportunity. Right now is the time to ask us for samples and see for yourself.

● *Manufactured in a modern, fully equipped plant under strict laboratory control,* Resproid *is compounded of high molecular weight resins which can be processed only on the latest plastic equipment and which give greatly superior wearing qualities. Insist on the name* Resproid *whenever you buy plastics.*

Respro INC.

CRANSTON 10, RHODE ISLAND



ALL BRANCHES OF INDUSTRY TURN TO *INSULATION*

ATTENTION PURCHASING AGENTS:

Send your prints to INSULATION for prompt quotes, studied engineering analysis and profitable comments and suggestions to improve your molded part!

INSULATION MANUFACTURING . . . serving all branches of industry with precision-made, custom-molded, plastic parts.

INSULATION MANUFACTURING CO., INC.

Custom Molders of Plastics for Industry

13 New York Avenue • Brooklyn 16, N. Y.

Micarta TAKES A DEEP DRAW TO SAVE YOU MONEY

When you need a tough, deep-drawing material for limited quantities—check Micarta. Deep, 24-inch draws, like the one illustrated below, are everyday jobs. Micarta, no ordinary "plastic" . . . is today's tough, versatile, industrial laminate. It has proved itself in thousands of industrial applications.

Besides formability, Micarta has other characteristics which make it the No. 1 industrial laminate:

HIGH STRUCTURAL-COMPRESSIVE STRENGTH—it is half the weight of aluminum for the same comprehensive strength.

HIGH DIELECTRIC STRENGTH—equivalent to mica, one of the best insulators.

HIGH HEAT RESISTANCE—easily withstands heat up to 230°F. Below zero it gains in strength without brittleness.

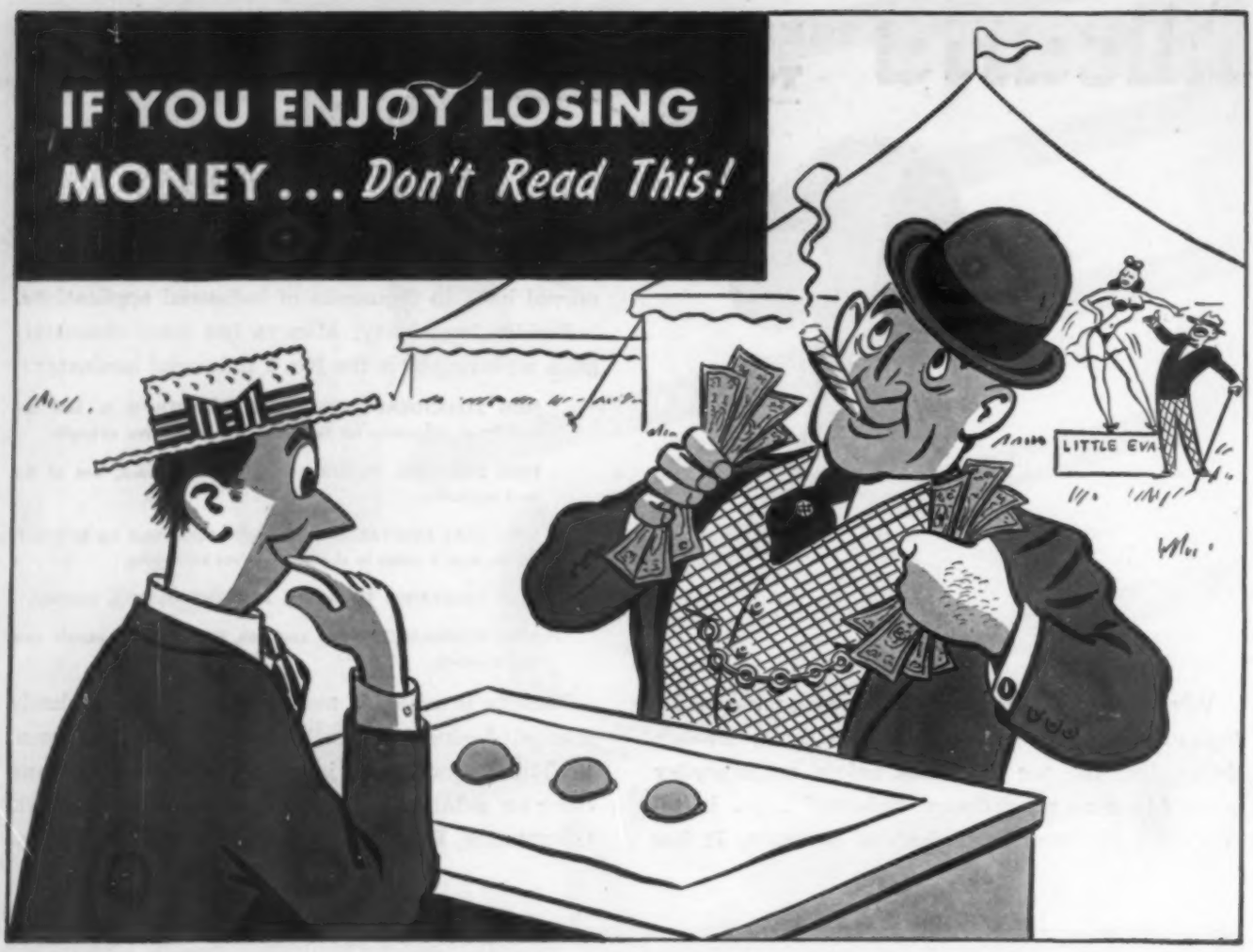
HIGH RESISTANCE TO ACIDS, ALKALIES—to 10% solution.

HIGH WORKABILITY—you can drill, tap, mill, die, punch, saw like a metal.

Micarta is available molded, formed or completely fabricated—in *mass production quantities*. Remember Micarta for a tough job . . . call your Westinghouse office for a Micarta Specialist. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-06402

Send for this new Micarta Data Book, today. Ask for B-3184-BM9 and the Micarta Facilities Book, B-3884-M9

IF YOU ENJOY LOSING MONEY... *Don't Read This!*



For we're talking to those who don't want to throw away any money on poorly-molded plastic parts or parts molded from the *wrong* raw plastic material. Such parts (and, unfortunately, there are some around today) don't do anyone any good, so why have any part in them!

For many applications, molded plastics have advantages equal to or greater than other materials. But, when you're considering using plastics, get in touch with a molder (like Boonton) who's known for good molding and with long experience at choosing the *right* raw plastic material for the specific job.

Why take a chance!

Be sure to LOOK AT THE NAME BEHIND THE CONTRACT.

Molded at Boonton Means Good Plastic Molding

BMCD

SPI — Society of the Plastics Industry

BOONTON MOLDING COMPANY

MOLDERS OF MOST PLASTICS BY MOST METHODS

FOR OVER 25 YEARS
CUSTOM ENGINEERS
OF MOLDED PLASTICS

122 EAST 42nd ST., NEW YORK 17 · SUITE 1716-M MURRAY HILL 6-8540

FACTORY—BOONTON, New Jersey

NEWLY REVISED EDITION!

National's "Successful Case Sealing" Booklet

Address: 270 Madison Avenue, New York 16; 3641 So. Washtenaw Ave., Chicago 32; 735 Battery Street, San Francisco 11; and other principal cities. In Canada: Meredith, Simmons & Co., Ltd., Toronto. In England: National Adhesives, Ltd., Slough.

EVERY TYPE OF ADHESIVE FOR EVERY INDUSTRIAL USE

BALDWIN
SOUTHWARK
STEAM
PLATEN PRESSES

- Original Design
- Accurate Workmanship
- Ample Strength—Low Deflection
- Uniform Temperature Distribution

Ask for information

BALDWIN
HYDRAULIC
PRESSES

The Baldwin Locomotive Works, Philadelphia 42, Pa., U. S. A. Offices: Philadelphia, New York, Boston, Chicago, Cleveland, St. Louis, Birmingham, Houston, San Francisco, Seattle, Washington, Pittsburgh.

Men working together, for production, can give America what it needs: more and finer products ...greater *values*... better standards of living... for all! Slow-downs or forced idleness deprive everyone of the gains industry can offer only through more production.

Only through cooperation for production can America benefit by the great technological advances of recent years. Modern MOSINEE papers, for instance, custom-made to meet specific requirements, are helping to improve products, slash costs, raise standards of living.

MOSINEE paper technicians are equipped to create paper with scientifically controlled chemical and physical characteristics to improve many products and processes. Call MOSINEE!

MOSINEE PAPER MILLS CO. MOSINEE, WISCONSIN

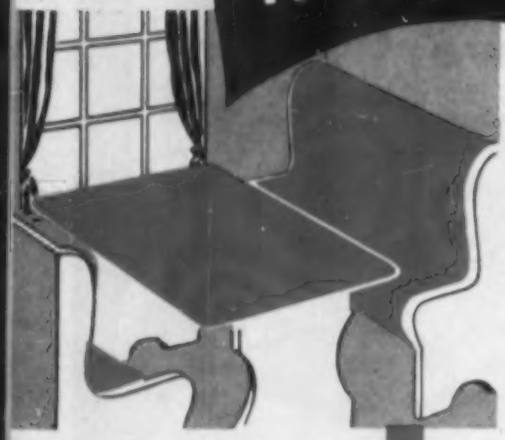
MOSINEE PAPER MILLS COMPANY

MOSINEE • WISCONSIN

Essential Paper Makers

Please address your letter Dept. "A"

WESTPLAK *is here*



THE NEW LOW-COST HIGH-DENSITY LAMINATE FOR TOPS — PANELS — WALL SURFACES

• EASY TO INSTALL

• AVAILABLE IN ROLLS OR SHEETS

WESTPLAK is the first decorative continuous laminate on the market available now in rolls or sheets of various thicknesses. It can be used for wall surfaces, table tops, furniture surfaces in stores, restaurants, theatres and institutions.

WESTPLAK won't crack, chip or dent. It is stain-proof, alcohol-proof, resists acids and is easy to clean. It withstands boiling water to degree never before obtained with a continuous laminate.

EASY TO INSTALL — With the aid of simple tools, the ordinary workman can install WESTPLAK. It can be bent cold around a 2" radius or, it can be heated and bent around a ½" radius. This means that for the first time a laminate can be easily installed on the job. This easy-to-install quality also makes WESTPLAK suitable for mass production methods.

AVAILABLE — There are, at present, 30 distributors located throughout the United States who have WESTPLAK in stock in standard sheet sizes and various thicknesses. It is available in blue linen, tan linen, red linen, solid red and solid black. Special patterns and colors can be supplied.

SIZES: Sheets are available in 6', 8', 10' and 12' lengths; in widths of 24", 30", 36" and 42". Thicknesses of 1/16", 1/32" and .015"

WESTERN PRODUCTS INCORPORATED

NEWARK OHIO

Look what you can do with WESTPLAK

YOU CAN HANDLE THE CURVES with perfect ease. The strip of WESTPLAK illustrated here was bent with the aid of a small amount of heat without any special equipment. This will illustrate how WESTPLAK can be installed on columns, radio cabinets, furniture, sink tops or curved bar or wall surfaces.

YOU CAN COVER LONG AREAS because WESTPLAK is available in continuous rolls. If your surface is 20 or 200 feet long, WESTPLAK will cover the job in one piece which eliminates fitting and joining. All the work can be done on the job.

COMPLETE INSTRUCTIONS AVAILABLE. For installing WESTPLAK an instruction book is supplied which lists the tools you need, tells, in simple, understandable language, how to lay out WESTPLAK, cut it and install it. Also gives suggestions for making simple bending equipment, sawing with power tools, cementing, molding and accessories.

Clip coupon and mail for free booklet on WESTPLAK.

Our engineering staff is available for consultation on industrial applications.

WESTERN PRODUCTS INCORPORATED
Newark, Ohio

Gentlemen:

WESTPLAK may help us reduce costs and improve appearanc
We are interested in its use for.....

☐ Send us literature, ☐ prices, ☐ name of distributor near u

Name.....

Company.....

Address.....

City.....*Zone*.....*State*.....

It's a Bicycle built for 2 Purposes:

Faster, Low Cost Assembly — Easier Selling

4-WINGED DRIVER CAN'T SLIP OUT OF PHILLIPS TAPERED RECESS

when you use AMERICAN PHILLIPS SCREWS

IN PRODUCTION — Here's the modern way to get the lower costs everyone wants — thru automatic, high-speed screw driving. Screw heads can't burr. Drivers can't slip. Work cannot be spoiled. Fingers can't fumble. And whether you're "buttoning up" bicycles or radios, appliances or airplanes, you cash in on time-savings up to 50%!

IN PROMOTION — Showmanship and salesmanship *go up* when American Phillips Screws *go in!* They look modern, *are* as modern as this minute. Buyers right down the line — jobbers, dealers, consumers — like their smart looks and the story they clearly tell of long service and solid construction. Write, wire, or phone for these production-promotion advantages today.

AMERICAN SCREW COMPANY, PROVIDENCE 1, RHODE ISLAND

Chicago 11: 589 E. Illinois St. *Detroit 2:* 502 Stephenson Building

AMERICAN PHILLIPS *Screws*

ALL TYPES

ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)

Plastic Trees
grow beautiful shoes

Our molding skill lends itself ideally to the production of these Shu-Pals shoe trees. Carefully molded they help well fitting shoes retain their molded-to-the-foot appearance.

These shoe trees further expand the variety of items whose sales appeal we have heightened through the artful use of plastics.

In every instance the merchandising appeal of smart modern plastics was coupled with sound production methods. Plastic materials used were chosen for stability as well as appearance. Production was engineered to save our clients both time and money.

Plastics, skillfully applied may well be the igniting spark to send your product soaring with renewed market appeal. Let us help you reach this new pinnacle of profit today. Consult us without obligation.

Shu-Pals Shoe Trees, Molded for Casanave Manufacturing Company Chicago, Ill.

Write on your letterhead for the new Injection Molded and Extruded Plastics catalogue. Or, for detailed information about MILLS-PLASTIC* pipe, tubing and fittings, write for circulars containing data and illustrations.

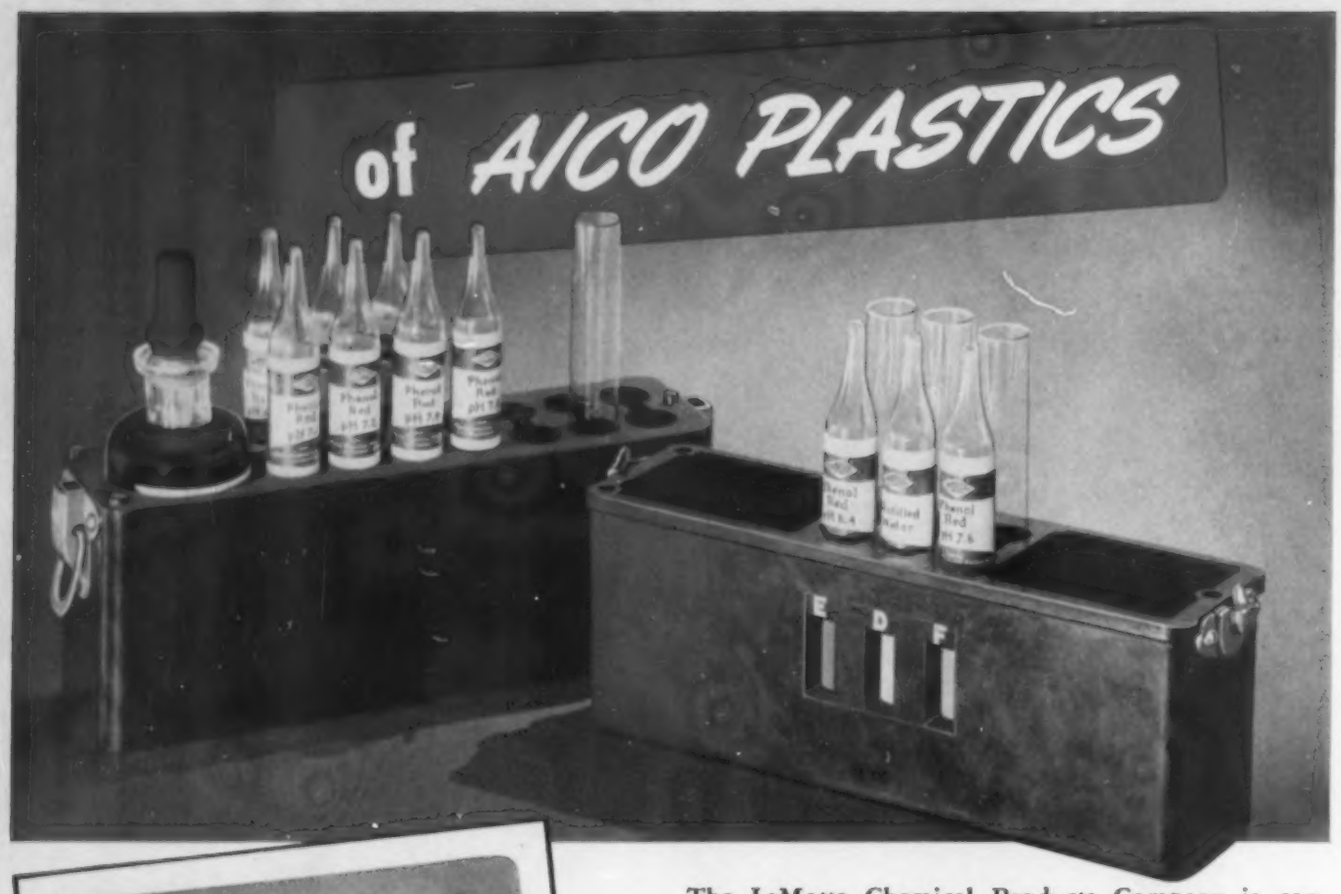
***Trademark Reg.**

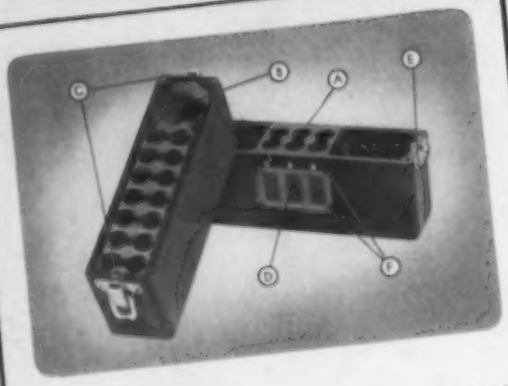
ELMER E. MILLS CORPORATION

INJECTION MOLDERS and EXTRUDERS of: Tenite, Lumarith, Plastacele, Fibestos, Lucite, Plexiglas, Nylon, Polystyrene, Styron, Lustron, Loalin, Vinylite, Geon, Plaxene, Polyethylene, Cerex, Forticel, MILLS-PLASTIC*, Saran, and other Thermoplastic Materials.

153 WEST HURON STREET • CHICAGO 10, ILLINOIS

An Old Reliable Gets a New Dress





MOLDING MATERIAL
Sturdy, inexpensive phenolic resin in a richly mottled brown tone was selected for this case.

MOLDING METHOD
Body and top are compression molded in semi-automatic molds. Uniform strength and thorough cure of both thick and thin sections are assured by electronic preheating. This also speeds the molding cycle to an economical rate of 1,000 complete cases per week.

MOLD DESIGN
The molds for this case include long cores which accurately produce the tube holding arrangement (A) and the bottle space (B). Short pins make the register points (C). The windows (D) in the top are formed by a hand operated side action. Holes (E) for mounting catches are drilled and corner slots (F) for retaining translucent plastic window are cut in after molding. Catches are mounted with self tapping screws.

The LaMotte Chemical Products Company is continually seeking ways to improve its comparator, a standard control instrument in many fields. Appreciating the value of expert technical advice, LaMotte brought the comparator case to Aico for re-design and manufacture.

The former wooden case was discarded, and along with it, wood's tendency to crack, chip, split and warp. In its stead, a more compact, moisture resistant, and durable plastic container now encases the LaMotte Comparator, making it an even finer instrument. Not the least of the improvements made possible through the use of a plastic case are the tapered light slots which produce sharper, more easily read color fields.

Aico's 30 years of molding all plastics by all methods can help you, too, to improve your product with plastics. Let's work out your problem together.

Aico
PRECISION MOLDING
for over 30 Years

Write today for descriptive, illustrated file of actual plastics applications by Aico.

AMERICAN INSULATOR CORPORATION
New Freedom, Pa.
SALES OFFICES: Cleveland — Detroit — New York — Philadelphia

MANY THINGS ARE BETTER BECAUSE OF PLASTICS

MODERN PLASTICS

VOLUME 25 SEPTEMBER 1947 NUMBER 1

Let's look at plastics advertising

IN THE history of plastics, 1947 will be recorded as the year when selling began. Material makers, facing or anticipating for the first time more than enough supplies to meet present demand; molders, fabricators and other processors with almost triple the capacity they had in 1941; manufacturers in whose end-products plastics are or can be used; distributors looking for new and improved products to sell—all these are involved in creating and applying the force called "merchandising" to the enlarging of markets for plastics materials.

At the end of the process is the consumer. The final force of plastics merchandising exists only to persuade him or her to spend money—on plastics. Other forces are trying to promote consumer spending on metals, textiles, wood, glass and rubber.

A big part of every merchandising force is supplied by advertising. And advertising has one peculiarity: along the channels through which it flows, regardless of where it begins, it can be either weakened or boosted in strength by those who gain most from having it hit the consumer with full impact.

How will plastics ad dollar be spent?

Over $5,000,000 will be spent this year in advertising plastics. Very roughly, it will break down into: $2,500,000 for vinyl advertising; $1,000,000 for other thermoplastics; $500,000 for thermosetting plastics; $400,000 for custom molders, laminators and fabricators; $300,000 for proprietary molders and processors to promote their own products; and $300,000 to cover institutional advertising, chemicals such as plasticizers, plastics-processing equipment and various services.

This estimate, frankly on the low side, includes the cost of sales promotion material, publication space, pictures, cuts, copy writing and printing. Of this amount, nearly $4,000,000 will be spent by the material manufacturers in building markets for the molders and fabricators who use their materials, as well as for the makers of products that contain plastics components.

Making that $4,000,000 hit the consumer with augmented force is the big reason for advertising expenditures by custom and proprietary processors and by end users who have a stake in plastics components.

Ad dollar follows material flow

Exactly parallel to the flow of materials toward the consumer is the flow of plastics advertising. The material may go to the custom processor, then to the industrial user in products parts, then to the wholesaler and retailer in finished products, finally to the consumer. Or the material may go to the proprietary processor who makes and sells his own complete plastic product, then to the distributive trades and on to the consumer. At each step the force of the advertising may be boosted.

Depending on the number and kind of materials he has to offer, the material supplier can address his advertising to the processor, the industrial user, the distributive trades and the consumer. Some may seek to reach only the processor and industrial user. Others, as an aid to proprietary processors, will direct their advertising not only to the processor but to the distributive trades and the consumer. In any case, the material manufacturers have accepted a big share of responsibility in creating markets for custom and proprietary processors.

Trademark is key

Key element in all advertising by material makers is the trademark or brand of material. This industry has taken to heart the lesson that products sell faster and at lower cost if identified with recognized brands and trademarks.

To the consumer the brand is the basis of pur-

The Plastiscope

With this issue MODERN PLASTICS Magazine inaugurates a new department, called The Plastiscope, devoted to news of the plastics industry, interpretations of the news and comments on current happenings that affect the industry. This section, which appears this month on page 196, replaces the former "News of the Industry" department and will be a regular feature of the magazine.

4 APPROACHES TO 4 ADVERTISING PROBLEMS

"In general our advertising is directed to vertical papers since our products Plymetl and Phemaloid (bonded with phenolic resins) are used extensively in the transportation field. We also use papers read by fleet owners, factory managers and product designers, and one horizontal executive magazine as an umbrella to cover all these vertical fields."

John J. Paige, Advertising and Sales Development, Haskelite Mfg. Corp.

"Since we supply material to the processor in partly finished form which does not lend itself to identification in the final end use, we have confined our advertising to industrial and trade papers. In addition, we have concentrated on direct mail advertising to selected lists of prospects."

C. A. Ihrcke, Advertising manager, Farley & Loetscher Mfg. Co.

"The consumers' final safety lies in the integrity of the people who sell to them. And the retailers, in turn, must depend on the responsibility of the manufacturer. Here the trademark identification of the material used is evidence of consistent quality and suitability to the application."

Harriet Raymond, Advertising manager, Celanese Plastics Corp.

"It seems obvious that selling will be of great importance in the year ahead. All concerned with the considerable advertising and promotion carried on in the plastics industry should make sure, therefore, that these efforts work to maximum effect."

E. J. Pechin, Advertising manager, Plastics Dept., E. I. du Pont de Nemours & Co., Inc.

chasing judgment. To the industrial user it offers assurance of consistent quality and approval of the application. To the retailer it implies a sharing of his responsibility to his customers. To the processor it provides assurance of engineering and research support. Every plastics material, however sold or advertised, has a trade name.[1]

Informative labeling supports trademark

When the material supplier is carrying his advertising through to the consumer, the brand name has most significance if it is tied directly to an informative labeling program. That, in turn, places on him the responsibility of assisting the processor in product design, quality control, styling—even packaging, display and promotion of the product.

Two such programs are those used to promote the Bakelite Corp.'s Vinylite material and the B. F. Goodrich Co.'s Koroseal. Both include tight control of quality and soundness of application.

The trademark Vinylite, with use of Trefoil identification on labels, is available to fabricators who use the sheet produced by the Bakelite Corp.'s vinyl plants, provided the product gains the approval of the company's Engineering Dept. and passes severe tests by an independent testing laboratory. This testing is maintained on a continuous basis by means of spot shopping in stores. To molders using Vinylite resins, the name, but not the trademark, Trefoil, may be used when their products have been properly approved by the engineering laboratory.

In the case of the B. F. Goodrich Co.'s Koroseal, the label and trademark are given to exclusive fabricators licensed by Comprehensive Fabrics, Inc., distributors.

Celanese Plastics Corp., using no consumer advertising, but reaching processors, industrial executives and distributive trades with its advertising, maintains an engineering and design service, a style advisory service, and a label and promotion service. The system of assigning the use of its trademark on labels is a four-way operation between the salesman, the sales director for the division concerned, the laboratory and the advertising department. Where the molder or fabricator uses one of the corporation's trademark names in his merchandising, there are three different ways of handling the deal:

1. Labels are supplied free of charge to molders and

[1] All these trade names are to be found in the Directory Section of Modern Plastics Encyclopedia.

fabricators where their names appear on the label.

2. Where both the Celanese name and the molder's name appear on the label, Celanese pays half the cost.

3. Where the trademark is molded in or stamped on in the course of manufacturing the product, the molder pays the whole cost.

More or less similar versions of label and trademark identification, with connected assistance in product styling and design, and quality control, are under development by other material manufacturers.

Consumer advertising without label support

Monsanto Chemical Co.'s Plastics Div. this year stepped into a big advertising program, featuring in national magazines products made from Lustron polystyrene by its customers. Each ad presents six items, and it is not expected that any one customer will receive more than one mention in any year. Yet it has operated without a coordinated labeling program.

The idea of all plastics material makers advertising is to create markets by interesting industrial executives in possible new applications, and by interesting the consumer in the products shown. The primary objective is to develop new business for the processors—the primary customers. Dow Chemical Co. advertises Styron wall tile, and several proprietary molders get wider markets for their molded tile.

Likewise operating without a labeling program, Tennessee Eastman Corp. has chosen a rather different pattern in the development of new markets for its customers. It uses advertisements in the business sections of 16 newspapers in 10 large cities once a week, having a total circulation of 5,000,000. The names of the companies molding or making the products illustrated are mentioned in caption, and in each city the advertisement carries the address of the office of the local Tennessee Eastman representative.

Coupling retailer with consumer ads

Coupled with consumer advertising is that directed toward the retailer. It may be tradepaper space, direct mail, bulletins or combinations of these plus additional services. Monsanto Chemical Co. offers a market-advisory service and, through *The Plastics Merchandiser*,[2] introduces its customers' products to big buyers in department stores, chains and wholesalers.

Another example of a market-creating advertising operation is American Cyanamid Co.'s concentration on color and mass markets for products such as tableware, plus special campaigns in the button and lighting field.

Going directly to industry

Where material suppliers do not go through to the consumer in a broad way in advertising their trademarked materials, they have little need for labeling programs. Their money is spent, therefore, to promote new and wider industrial applications—the objective of a lot of advertising money being spent even by those who feature consumer advertising.

Standard procedure in this industrial promotion is the use of ads directed to executives, engineers and designers in industries which offer markets for plastics parts. It is all planned to build business for processors as well as to give end product makers better, more saleable products.

The plastics advertising of E. I. du Pont de Nemours & Co., Inc., employs examples of new plastics materials applications in order to create markets for its customers, levering this advertising on its product names. One of the company's plastics ads won the Associated Business Publications contest this year. It featured a baby's feeding dish molded of nylon, and produced several hundred replies, at least one of which resulted in considerable new business for molders. Replies are keyed according to type of inquirer and his business.

The phenolic material makers, having materials that are generally used in components rather than in complete products and having years of market development behind them, concentrate on industry.

Bakelite Corp.'s Thermosetting Div. directs its advertising with two objectives in mind. The first is concerned with established markets where the applications of plastics have proven acceptability. The intent is to increase consumption of plastics in these markets.

The second seeks to foster new uses for plastics by introduction of new formulations in existing markets or entrance into new industrial fields. In either case, advertising is launched only after materials and applications have been thoroughly tested.

Durez Plastics & Chemicals, Inc., making only phenolic resins, varnishes and molding powders, concentrates its promotion in industries that have made relatively little use of phenolics to date, thus opening new avenues for the contracting molder. Where comparable applications are available they are featured along with their qualities. In virgin fields, publication

Consumers Evaluate Advertising

"A current study of "Consumer Attitudes toward Distribution," by the Committee on Consumer Relations in Advertising, shows that 72% of consumers feel advertising helps to make personal selling more efficient; 77% think advertising helps to improve living standards; 80% recognize advertising as an essential element of the country's economic system; and 94% think an important task of advertising is to arouse interest in goods and create a desire to buy them. *But*, about 75% said that retail sales clerks can't give customers the information needed for intelligent buying.

Industrial Bank of Commerce, New York

[2] "Your selling plans must be keyed to your outlets," MODERN PLASTICS 24, 105 (May 1947).

THESE NATIONAL ADVERTISERS ARE PROUD TO USE PLASTICS

Sentinel Radio Corp.: "A diminutive jewel of a set...two-tone plastic cases in various color combinations."

Barclay Mfg. Co., Inc.: "Plastic-coated panels that go up in a jiffy, immediately bringing the richness of warm color into your home."

Emerson Radio Corp.: "Beautiful palm-of-your-hand receiver in plastic in a range of colors."

Eversharp, Inc., "...plastic barrel in choice of colors."

Telex, Inc.: "Exclusive new aperture of opalescent plastic."

Marsh Wall Products, Inc.: "Plan on Marlite plastic-finished panels."

Barcalo Mfg. Co.: "Long-lasting and easy to keep clean...as are the comfortable plastic arm rests."

Telechron, Inc.: "...with an ivory color plastic movement cover."

advertising is not used, but direct mail and personal contact do this work. Monsanto, featuring phenolics in executive magazines, uses example copy generally.

Catalin Corp. of America recently used a broadside in four colors, reprinting plates from an ad to stage a drive on the radio industry. A mailing piece based on a personal retail survey of what makes radios sell was sent to 100 radio manufacturers, 400 wholesalers and 18,000 radio outlets. Response was splendid.

Other good examples of market-development advertising are the product engineering approach to industrial executives by the Plaskon Div. of Libbey-Owens-Ford Glass Co.; and Velveray Corp.'s successful attempt to establish Fuseprint, a printing service on vinyl film, as a trademark acceptable to retailers and backed by independent laboratory tests. Velveray also offers a styling and color selection service and retail promotion assistance. A departure from usual injection-molding equipment promotion is the advertising of Lester-Phoenix, Inc., aimed at securing inquiries from prospects for the services of molders using its machines.

Beyond formal advertising directed either toward ultimate consumers or toward executives in industries who can use plastics, the materials manufacturers are doing a powerful promotion job on retailers and wholesalers. The Vinylite advertising of Bakelite Corp., for example, includes the use of seasonal folders or broadside promotion pieces which will contain illustrations and descriptions of the products of several fabricators.

The principle here is to hit the market with such promotion at least three months in advance of the time when the products will be put on sale. Thus, it is advisable to promote Christmas goods to retailers not later than October, and June bride items not later than March. These promotion pieces, which have a worthy record of effectiveness, may include suggestions for window displays, copy ideas for retail promotion and even newspaper advertising mats so that dealers may illustrate the products in their own newspaper ads.

All material manufacturers invariably offer technical booklets of a detailed engineering nature, telling how their materials may be used in the production of better products or components. Bakelite Corp. has established a standard formula for this operation, producing the booklets in series for permanent reference. Some outfits are going even further and in a different direction, by offering printed material to processors and to distributors that may be passed on in the course of sales promotion. Such items are Bakelite's *The ABC's of modern plastics*, Velveray Corp.'s *The story of plastics film*, the B. F. Goodrich Chemical Co.'s new *Glossary*, and consumer-interest booklets from Rohm & Haas Co. and Plaskon Div. of Libbey-Owens-Ford Glass Co.

Advertising backed by publicity

The larger material supply companies have potent publicity machinery to help their customers introduce new products and thus to create new markets. There is no uniform arrangement for the handling of such matters. E. I. du Pont de Nemours & Co., Inc., and Tennessee Eastman Corp. are perhaps unique in sending plastics products publicity through their plastics advertising section, rather than through a general public relations department.

A few companies provide services beyond these, by means of their house organs, news bulletins and personal contact setups. Celanese Plastics Corp., for example, each month sends its *Newsletter* to 1500 radio commentators and columnists in daily newspapers and in magazines. These are all part of the same machine—designed to sell more and better plastics products, to keep molders and fabricators and end users profitably busy using the advertiser's materials.

How processor can boost ad impact

Great stuff! Then where does this business of "boosting the force of advertising" come in, on the part of processors, industrial end users and distributors?

Market survey—The first key to the boosting of advertising impact to the end that more plastics may

be sold is the fact that not one cent is spent on advertising by any material makers without a market survey. By this means broad but specific targets are outlined—by industries and by groups of applications—based on probable volume. Then examples of comparable successful applications are featured.

What better lead could a molder or fabricator want? Very few molders are in a position to do the type of advertising and promotion job being done by the Plastics Div. of General Electric Co. This company, reputed to be the largest processor of plastics in the world, makes its own phenolic resins as well as silicones, and offers a complete service of design, molding, fabricating and laminating of all materials.

General Electric Co. makes its own market surveys and also has industrial research organizations make studies to find what industrial fields are likely to be most productive of the type of business and the volume of business the company wants. Advertising copy is then built around effective jobs that will appeal to those fields, because of similarity in the problems involved.

Any custom molder, advertising on his own behalf to industrial executives, can get market advice from his material suppliers, and advertise in tune with them—thus boosting the force of both advertising programs.

Tie in with distributor—The second key to boosting is in the hands of the proprietary processor of components. Here a lead may be taken from the vinyl processors who spend slim budgets to good effect.

Respro, Inc., making Resproid plastics, has worked out with its distributors a plan whereby Respro, Inc., advertises in publications when it is seeking an acceptance of Resproid, while the distributors use space in publications going to fabricators. Both are supported by a regular direct-mail and sampling promotion. Respro, Inc., also maintains a labeling program.

The decorative laminators, such as Formica Insulation Co., General Electric Co., Farley & Loetscher, Daystrom Corp., have a special advertising task in promoting sales to restaurants, hotels and institutional users of their materials or products. Some of these companies encourage end-product manufacturers (such as the builders of kitchen sink and cupboard units) to feature material tradenames in secondary advertising.

A lesson may be learned from the operations of United States Plywood Corp. There are many makers of plywood, but only United States Plywood makes Weldwood. The company decided toward the end of the war to select for first attack a volatile field in which tangible interest would be forthcoming, rather than a field which promised to be the biggest. It therefore selected what is known as the "shelter field," and used advertising in magazines read by people who owned homes or hoped to build homes. The campaign succeeded beyond the fondest hopes of the company, and close to 500,000 inquiries were processed. The company's advertising also includes an extensive program of trade advertising directed at architects, builders, lumber dealers, wood fabricators, etc.

This is the lesson: promote the quality of your own plastics product and you'll find that the whole industry will be in tune. To boost the force of all plastics advertising, pick lively markets where notice is likely to get a reaction.

Take advantage of material makers publicity—The third key to boosting this force is the responsibility of the proprietary plastics processor to take every advantage of the publicity offered his product by the material maker, to use reprints of his color ads in merchandising, to use worthy labels featuring material trademarks. He should not expect to be spoon-fed to sales stature. More merchandising exercise will do him good—and will boost the ultimate total force of plastics advertising.

Include plastics in end user ads—Finally, key number four is that of the end-user who advertises a product in which plastics components are used.

While it is generally admitted that public appreciation of "plastics" as a name to be mentioned in advertising has improved during recent months, a quick analysis of a specific range of advertising in selected media proves the point beyond all doubt. In four issues (from mid-June to mid-July) of each of the two biggest-circulation national weekly magazines, running a total of well over 30,000,000 copies, there were:

Twenty-four radio ads in which plastics were mentioned eight times, wood four times, simulated leather two times, steel one time, aluminum one time.

Eight ads for fountain pens and automatic pencils in which plastics were mentioned twice and metal twice.

Six toothbrush ads with two mentions of plastics and one mention of a glass case.

Five clock ads in which plastics were mentioned once and other materials not at all.

Eight ads for sunglasses in which metal was mentioned once, glass once and plastics not at all.

Fourteen refrigerator ads in which plastics were mentioned once, steel twice and glass three times.

Eight camera ads in which aluminum was mentioned twice, metal once and plastics not at all.

Out of 73 ads, plastics as components were mentioned fourteen times as contributing to the desirability of a product. Steel was mentioned three times, wood four times, metal four times and simulated leather (obviously a plastic) twice.

Leaving out the radio-set ads, plastics still would have a big lead, finding mention in six out of 49 ads as compared with four for glass, four for metal, one for aluminum and two for steel.

In none of these ads was a type of plastic or a material brand-name mentioned. But the proud mention of a case or a part as "plastic" adds a boost to the force of plastics advertising as it strikes the consumer.

One of the tenets of marketing is that advertising will not sell an unworthy product or material for long. In today's competition, worthiness is decided by the consumer in a few days or weeks. That decision is being taken in favor of plastics. The product is sound. The customers are waiting. Now is the time for the plastics advertiser to take advantage of this condition.

4-COLOR PLATE, COURTESY DOW CHEMICAL CO.

Interest of many radio manufacturers in thermoplastics for cabinets can be attributed to their color. Polystyrene was selected for this particular portable for such additional advantages as rigidity and low cost. An interesting design feature (illustrated at right) is way chassis is inverted to avoid "hot spots"

Picking the right plastic is essential

Whether a radio is to be used indoors or out, its intended cost and quality influence type of plastics selected

ZENITH Radio Corp.'s faith in the future of plastic radio cabinets and other components is immediately evident upon inspection of the company's broad line of 30th anniversary models, now on the market. A pioneer in adapting plastics to this field, Zenith is constantly studying new materials and techniques in order to excel its own high standards of appearance and performance, and to bring better radionic equipment within the reach of more people.

Utilizing both thermosetting and thermoplastic materials, this radio company is now producing a number of table models and portables having plastic cabinets of fresh, distinctive design. In addition, such components as plastic dial crystals and control knobs are widely used on small and large wooden cabinets.

Representatives of the plastics industry have occasionally heard somewhat disturbing reports that plastic radio cabinets were too much alike in appearance, that mold limitations were a serious obstacle to the development of more original designs, and that the public was prone to regard plastics in radio cabinets as a substitute, rather than as a new material, desirable because of its own special properties.

Public accepts plastics cabinets

That this conception of plastics cabinets has no substantial basis in fact is attested by H. C. Bonfig, vice-president and director of sales for Zenith. In a statement for MODERN PLASTICS, Mr. Bonfig said:

"Our company was among the first in the radio industry to put the major part of its table model line into plastic cabinets to achieve the beautiful lines not attainable with other materials. Public acceptance of these models has been tremendous.

"Zenith's newest all-plastic model is the Holiday portable, housed in a rich maroon polystyrene cabinet

with a matching plastic-over-steel handle. The color in plastic accentuates the modern design, and people buy this radio practically on sight.

"We feel certain that the success of our table radios and this new portable point the way for plastics in this field, and that future use of them will be limited only by the ingenuity of molders. The Holiday is one of the largest radio cabinet moldings ever accomplished in polystyrene; that they are now being produced in quantity gives evidence of the progress being made by the plastics industry."

The Holiday model cited by Mr. Bonfig is being produced by Chicago Molded Products Corp., 1020 N. Kolmar Ave., Chicago 51, Ill. Although smaller thermoplastic cabinets are now in production by other manufacturers, this set illustrates what can be accomplished with larger units on the high-capacity injection molding equipment now available.

The beauty of this portable is far more than skin deep. In discussing some of the problems which arose in connection with the set, Herbert H. Steglich, assistant chief mechanical engineer of Zenith's Household Div., indicated basic considerations involved in designing a thermoplastic radio cabinet of large size.

Most of the portable models now on the market are of the so-called luggage type, covered in leatherette or similar material. In general, they would appear out of place if used in the living room. In bringing out the Holiday model, the company sought a design which would be at home on a picnic or outing, and could still take its place comfortably as a tasteful complement to the average home.

Reason for choice of a thermoplastic

A thermoplastic was a logical choice for this purpose because it had to withstand the normal shocks incidental to being carried about within or outside the home. Its use also opened up a rich store of color possibilities. After a careful review of available thermoplastics, polystyrene was chosen for its rigidity, surface hardness, water resistance, desirable electrical properties, relatively low cost, and ease of molding by the injection process. Its light weight also was a virtue, and the fact that its output had been greatly increased during the war promised ample supplies.

Problems attend use of thermoplastic

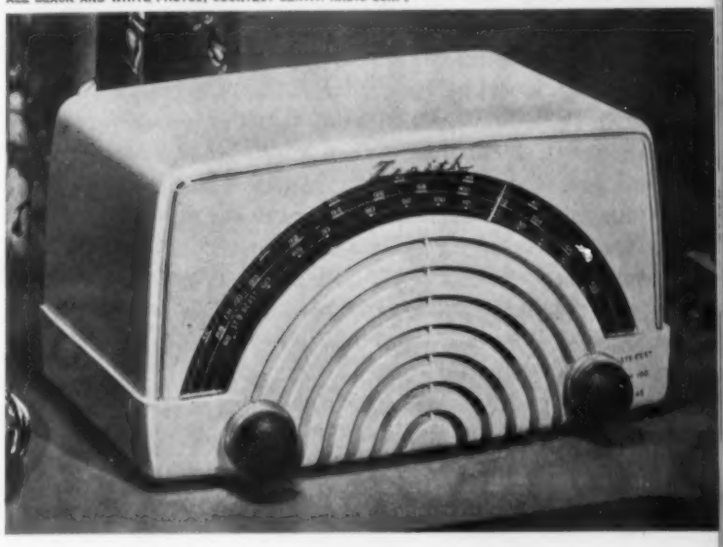
The primary requisite for success in a thermoplastic cabinet, Mr. Steglich declares, is a design that distributes stress uniformly. This entails a study of how the weight of the chassis can be suspended in the cabinet to insure minimum distortion. In the case of the Holiday this involved some differential in wall thickness. The back, hinged at two points along the bottom edge, had to snap closed firmly after the chassis was installed; due allowance had to be made for the small but vital change in dimensions produced by the weight of the chassis.

As shown in the illustration on page 78, the Holiday chassis is suspended in the cabinet by means of two internal channels molded integrally with the case. Thread cutting screws passing through an opening in the chassis and engaging concealed lugs in the front wall of the cabinet secure it in place.

Rather than being massive in design—which might have concentrated the stress along the side wall and produced deformation—the supporting channels are relatively flexible, permitting them to absorb and distribute shocks throughout the cabinet. This "roll with the punch" engineering concept, well known to bridge builders and also exemplified in the "floating-power" engine mounting used on some automobiles, may be applied with equal success to radio cabinets, Mr. Steglich states.

Company engineers have found that a thermoplastic cabinet involves other important problems. Flow lines, weld lines, sink marks and gate location must be watched carefully. Weld lines may be effectively concealed by judicious use of ribs or other design ele-

ALL BLACK AND WHITE PHOTOS, COURTESY ZENITH RADIO CORP.



Phenolic radio cabinets are frequently produced in quantity in walnut color and then finished in ivory or in other colors by spraying. Thermosetting cabinets are particularly desirable where mottle effects are wanted

ments, or caused to occur in the back of the cabinet where they will not be seen. In the center gated Holiday cabinet, the sprue presents no difficulty because it is directly removed in a hole-cutting operation which produces an opening for the concentric control knobs. Occasionally, however, a design may be encountered where it is necessary to conceal the gate behind an escutcheon plate.

Flexible handle reduces strain

No detail was overlooked to insure that the Holiday would meet normal service conditions. The special Zenith "Permo-Stretch" handle on this set is composed of three elements—a two-piece spring steel ribbon, joined at the center with a rivet that slides in a slot to permit expansion; a strip of rubber beneath this for additional resiliency, and a Tenite II extrusion wound spirally around the entire assembly for appearance and comfort. This design places no strain on the plastic when the set is lifted. Possible uses for this style of patented handle on luggage, handbags and other items are now being studied.

The heat problem is constantly in the mind of company engineers in working with thermoplastic cabinets. Here it must be remembered that the heat created by the set itself is superimposed on the room temperature, producing a total considerably higher than might be imagined. To permit escape of internal heat, the Holiday is vented by four slots at the back, near the top, and five slots near the bottom. Also, the chassis is suspended in an inverted position within the cabinet. Upright tube position would have created two serious "hot spots" on the top of the case.

Honesty in selling is a cornerstone of Zenith policy. The Holiday, for example, is not recommended for the buyer who is constantly on the move and will be subjecting it to repeated rough handling on trains, buses or in cars. The prospective purchaser is frankly told that a luggage-type portable is better adapted to this type of service.

Phenolics and urea also used

A number of the current Zenith table models are being run in general purpose phenolic material. From the merchandising standpoint, it is frequently expeditious to run a quantity of phenolic cases in walnut, finishing as many as necessary in white or ivory by spraying them. The radio company has also run a number of cabinets in urea. The wide color range of urea gives it considerable merchandising appeal, although pricewise it is, of course, beyond phenolics.

As a general rule, company engineers prefer to avoid the use of inserts. It has been their experience that inserts are frequently more of a handicap than a help, due to the difficulty of matching their coefficient of expansion to that of the molding material. Thread cutting screws, engaging cored internal bosses, have proved adequate for most assembly purposes.

Plastics have been a valuable ally to the radio industry because they permit lowering the over-all price of the instrument and giving the buyer the same basic electronic equipment which he might obtain in a cabinet model only at a much higher cost. It is interesting to note that in the large wooden console sets, approximately half of the retail cost represents the cabinet.

Zenith believes firmly that the public likes and will continue to buy plastic cabinet radios. William H. Boyne, general manager of Zenith Radio Distributing Corp., states:

"Our continuing tremendous sales volume of radios housed in plastic cabinets provides the answer to any question about the public's acceptance of them.

"We have found that people prefer the white plastic in our table model line, with black in second place and brown third. However, our new Holiday portable proves the desirability of color in plastic."

A NEW SEALING COMPOUND WHICH IS, in effect, a combination of plastic binder and long fibered asbestos filler, has been announced by National Engineering Products, Inc., Washington 4, D. C.

The material is used primarily to seal joints in boiler casings, air conditioning ducts and ventilation systems for sound absorption as well as the maintenance of air-tight joints. It can also be used to seal cable ends, cable connections and terminal boxes for good electrical insulation and protection against moisture absorption and damage due to exposure.

It has a specific gravity at 25° C. of 1.62 with a plasticity of approximately 4.5 M.M. under a 50-gr. load at 25° C. It has no tendency to soften or melt at any temperature, according to the producer, who asserts that it is resistant to 400° F. and maintains a seal at 450° F. It does not support combustion, meets type HF Navy fireproof requirements and has no after-glow.

Tempseal, the new material, is claimed to be highly resistant to water and absorbs less than 1/2 percent during 24 hr. of immersion. It has no tendency to harden and will not crack or craze during vibration.

The material is non-toxic and may be applied with the fingertips or by knife or spatula. The weight per gallon is approximately 10 lb., and is available for immediate shipment.

How to use nitrile rubber-vinyl resin

by J. E. PITTENGER and G. F. COHAN*

THE physical blending of synthetic, organic materials is a technique that promises the creation of many new products having not only improved physical properties but also properties never before attainable in the original materials. Many advances and improvements were made by the blending process during the last war. One has only to look at the synthetic rubber and the plastics industries to see the results. This knowledge, carried into peacetime with many added months of development work, has resulted in a new product called Geon polyblend.[1]

This new material combines the oil, chemical and age resistant properties of Geon polyvinyl chloride resin with the solvent resistance and flexibility of Hycar nitrile rubber. This versatility makes the new material of interest to both the rubber and plastics formulator, for it can be handled on either plastics equipment or rubber machinery. It can be compounded with color pigments, fillers, stabilizers and rubber antioxidants to give a long-life thermoplastic material. Unsaturated nature of nitrile polymer constituent permits vulcanization.

Blending polyvinyl chloride and acrylonitrile polymers contributes two outstanding advantages useful to the plastics and rubber industries. The use of polyblend makes possible the realization of many of the good properties of vinyl plastics without the troublesome factor of plasticizer migration. Of equal importance is the fact that polyblend is generally more resistant to aging than a straight nitrile rubber alone.

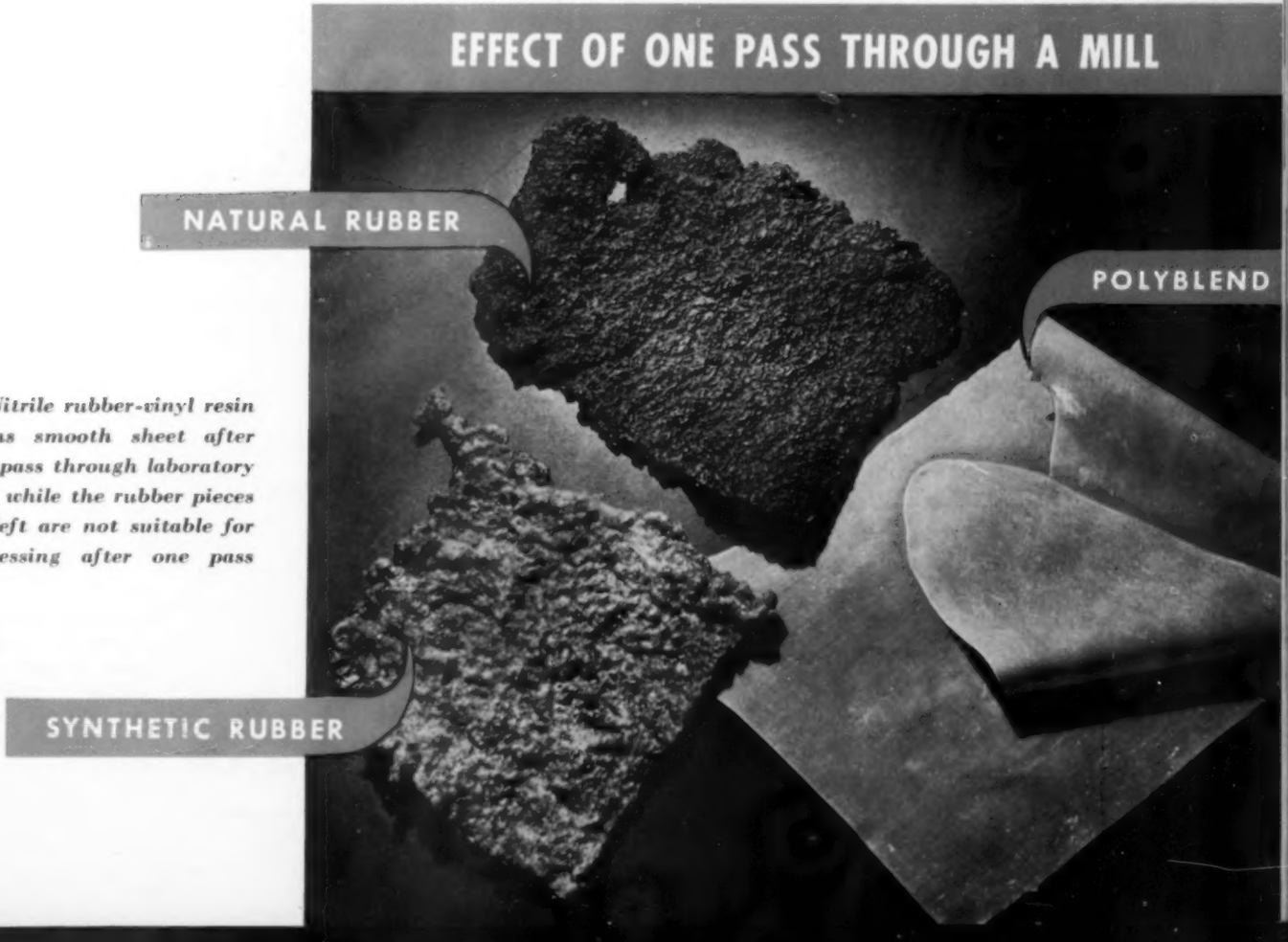
The combination of these and other outstanding properties has been captured by blending the two polymers in a colloidal state, thereby eliminating the need for any liquid plasticizer. The result is a new basic raw material ready for compounding. Heretofore such blends have been possible only by involved mill-mixing.

Polyblend is furnished in the form of light yellow

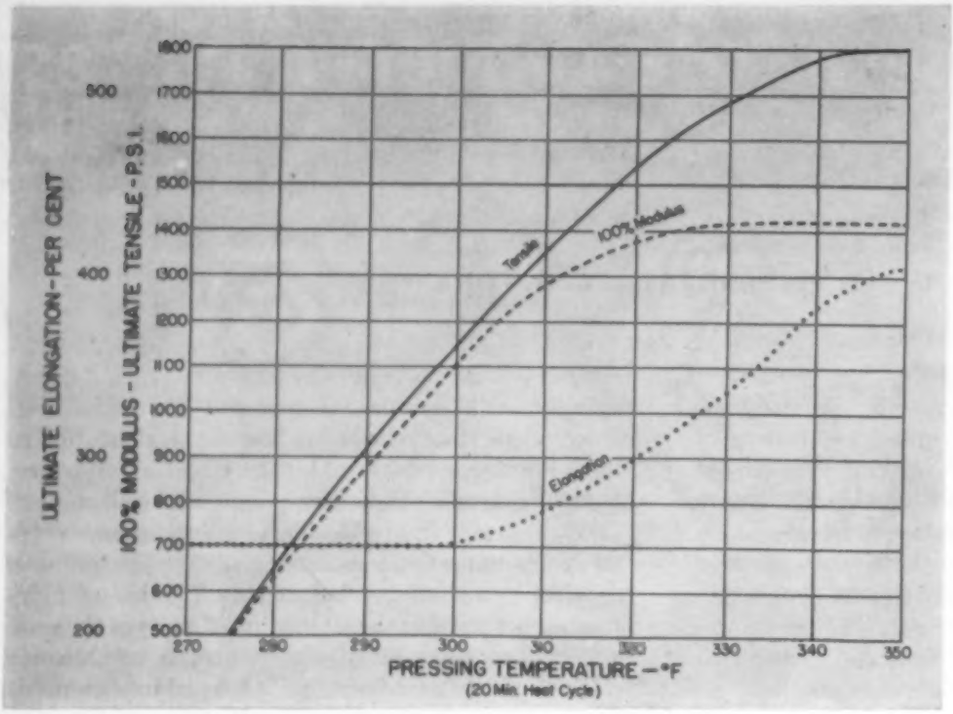
* Technical service engineers, B. F. Goodrich Chemical Co. 324 Rose Bldg., E. Ninth St., Cleveland 15, Ohio.

[1] Developed by B. F. Goodrich Chemical Co.

ALL PHOTOS AND CHARTS, COURTESY B. F. GOODRICH CHEMICAL CO.



1—*Nitrile rubber-vinyl resin forms smooth sheet after one pass through laboratory mill while the rubber pieces on left are not suitable for processing after one pass*



2—Stress-strain properties vs. pressing temperature of polyblend No. 500 × 329 that is sheeted out on cold mill

sheets about $^3/_8$ in. thick. Because of its dual nature it can be compounded in any of three major categories.

1. Used as thermoplastic similar to a vinyl.
2. Formulated so as to respond to vulcanization.
3. Last, but not least, it can be used to modify either a conventional polyvinyl chloride type plastic or a nitrile rubber compound.

Whether used as a plastic or a rubber, all of the compounding can usually be carried out on a cold mill. When used as a modifier it must be mixed under the conditions that govern the proper handling of the material to which it is added.

In compounding polyblend to be used as a thermoplastic material, the nitrile rubber constituent can be regarded as a polymeric plasticizer. Table I shows the properties obtained by sheeting out the uncompounded stock and molding it for 5 min. at 345° F. The tensile strength of the thermoplastic molded sheet is not equivalent to the usual polyvinyl chloride plastic but is adequate for a great many applications. The hardness can be reduced if desired by using a conventional plasticizer since polyblend is readily compatible with all the plasticizers useful in manufacture of vinyl plastics. For example, 10 parts of dioctyl phthalate added to 100 of polyblend will reduce the hardness from 93 to 85. Concentrations of plasticizer of this amount do not seriously impair non-migratory properties of compounds.

For stocks which are to be milled, calendered or extruded, a small amount of lubricant is advantageous to improve processing. Such materials as lead stearate, stearic acid, paraffin and Acrawax "C"[2] have been found satisfactory. Lubricants keep the stock from sticking to hot mills or calender rolls and aid in extrusion. The choice of lubricant will depend on the application. For example, lead stearate is sometimes preferred because it also has a stabilizing action. However, it cannot be used where toxicity is a factor.

In heat or light resistant applications, the resin portion of the blend is subject to thermal breakdown, the same as conventional vinyl stocks. Excessively high temperatures will accelerate the oxidation of the rubber portion of the polyblend, as in straight Hycar or other rubber polymers. Thus, the normal heat stabilizers for vinyls—such as lead stearate, basic lead carbonate, SN[3] and V-1-N[3]—should be used where high temperatures are encountered in processing or in the service conditions peculiar to the finished article. For normal processing operations, such as calendering or molding, the material is sufficiently stabilized during manufac-

[2] Product of Glyco Products Co., Inc., 26 Court St., Brooklyn, N. Y.

[3] Advance Solvents Chemical Corp., 245 Fifth Ave., New York 16, N. Y.

Table I.—Physical Properties of a Typical Geon Polyblend (55 percent Polyvinyl Chloride, 45 percent Hycar)

Tensile strength, p.s.i.	1850
Elongation, percent	430
100 percent modulus, p.s.i.	1100
Hardness (Shore Durometer "A")	93
Specific gravity	1.18
Crescent tear, lb./in. (A.S.T.M. D 624–44)	320
Rectilinear tear, lb./in.	328
Low temperature brittleness (A.S.T.M. D 736–43 T)	−60° F.
Flexibility	Superior to rubber and Hycar but not as good as liquid plasticized polyvinyl chloride
DC volume resistivity, ohm-cm.	2.6×10^9
Dielectric strength, volts/mil, $^1/_{32}$-in. wall	960

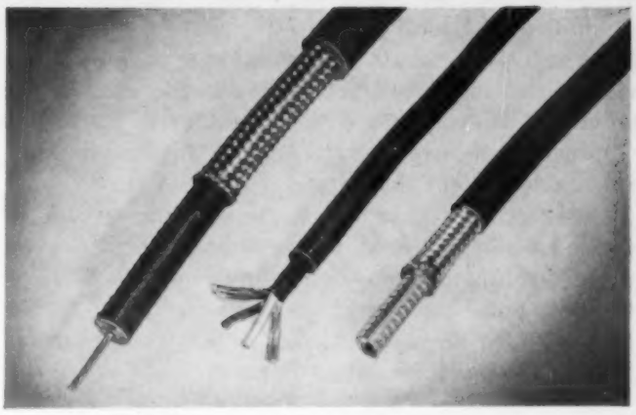
ture. When the resin portion of the polyblend has been stabilized, the heat resistance of the compound is similar to a vinyl plasticized with tricresyl phosphate.

Heat stability—For maximum heat stability, the rubber portion should be protected with an antioxidant like Agerite Stalite.[4] This is shown in Table III (page 85) where tensile, elongation, modulus, Durometer hardness data on stocks aged in air at 212 and 250° F. are presented. The percent loss in weight after aging at high temperatures (212° F.) is also shown. It will be noted that results on polyvinyl chloride formulations plasticized with dioctyl phthalate and tricresyl phosphate to a similar hardness are listed for comparison. The low weight loss of the polyblend compared to the tricresyl phosphate stock shows the non-volatile character of the Hycar as a plasticizer.

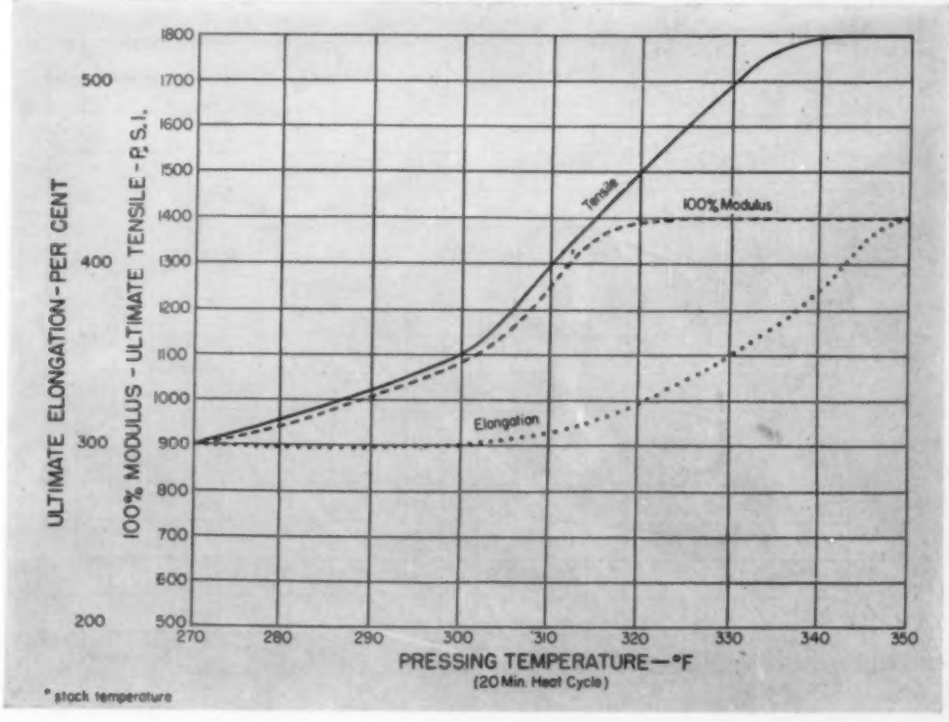
The figures from the 250° F. test demonstrate the value of using both vinyl stabilizers and rubber antioxidants for high temperature applications. After five days at 250° F., the polyblend compound, without additional antioxidant, was no better than the liquid plasticized stocks. Polyblend with 1 percent antioxidant (Agerite Stalite), however, retained its original properties and was little affected by the high temperatures. In general, most antioxidants promote discoloration of stocks exposed to light for long periods.

Sunlight resistance—The same approach is used in compounding polyblend for sunlight resistance. Stabilizers, such as Vanstay[4] and V-1-N are used for the vinyl portion in conjunction with special pigments for the rubber portion. Some pigments found to be effective are: carbon black, iron oxide, lead titanate (white), cadmium lithopone (yellow), basic lead chromate (orange), cadmium selenide (red), phthalocyanine blue and aluminum powder. Iron oxide should be used in

[4] R. T. Vanderbilt Co., Inc., 230 Park Ave., New York City.



3 (above)—Cables are jacketed with polyblend resin. Left to right: aircraft primary lead, x-ray, radar cable.
4 (below)—As shoe welting polyblend allows better bond



5—Stress-strain properties vs. pressing temperature of polyblend No. 500 × 329 that has been milled at 300° F. for 15 min. prior to pressing*

amounts of at least 3 parts per 100 parts of polyblend. Most of these pigments are somewhat opaque to ultraviolet light and retard surface cracking. In general, polyblend compounds are more resistant to light than non-black nitrile rubber stocks, but are considerably less stable to light than liquid plasticized vinyl resins. Light-energized oxidation of the unsaturated rubber portion of the polyblend is the main cause for this fact.

Press-polishing formulation—Polyblend is well suited to press-polishing operations. A small amount of lubricant and color will usually suffice for compounding. A typical formulation follows:

	Parts
Polyblend	100.0
Color black[a]	1.5
Acrawax "C"	0.5–1.0
Lead stearate	0.2–0.3

[a]25 percent carbon black—75 percent dioctyl phthalate masterbatch. The addition of about 5 parts of dioctyl phthalate per 100 parts of polyblend will impart better drape characteristics to the sheet if this is desired.

Varying the flexibility—Phenol formaldehyde resins may be added to polyblend in varying proportions to form products ranging from flexible adhesives to tough, rigid materials of high impact strength. The following formulation was mixed on a cold mill and molded into tool handles and hammer heads.

	Parts
Polyblend	100.0
Durez 12687[a]	50.0
Clay	75.0
Calcium stearate	2.0
Stearic acid	2.0
Color	0.5

[a]Durez Plastics & Chemicals, Inc.

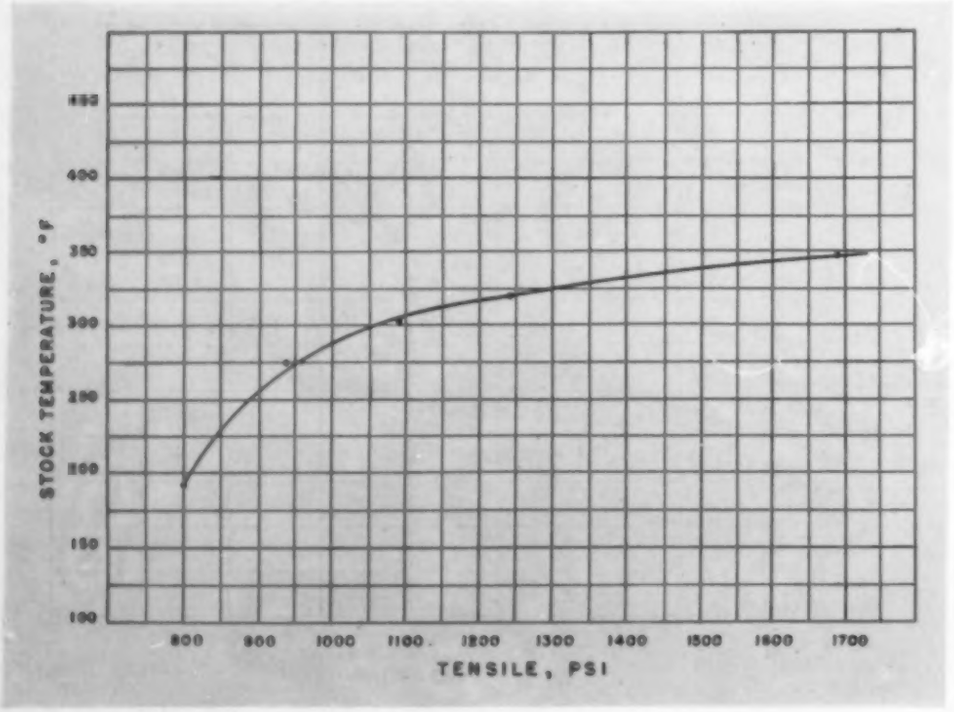
Polyblends can be dissolved in methyl ethyl ketone to form solutions containing 25 to 30 percent solids. Compounds are mixed in the usual manner on a cold mill and dissolved by stirring them at room temperature.

Table II.—Comparison of Physical Properties of Vulcanized and Unvulcanized Polyblend

	UNVULCANIZED 100 parts polyblend	VULCANIZED 100 parts polyblend 1.5 parts sulfur 1.5 parts benzothiazyl disulfide 0.5 part selenium diethyl dithiocarbamate 5.0 parts litharge
Molded	5 min. at 345° F.	30 min. at 310° F.
Tensile strength, p.s.i.	1850	3150
Elongation, percent	430	325
100 percent modulus, p.s.i.	1100	1775
Hardness, Shore Durometer "C"	70	73
Compression set, percent (A.S.T.M. D-395 40 T Method B)	75	52
Abrasion resistance (A.S.T.M. Standard B)	55	241

Vulcanizing—Since polyblend contains unsaturated nitrile rubber, it can be vulcanized like other rubber polymers. Table II contains a comparison of the physical properties of vulcanized and unvulcanized polyblend. Mercapto benzo thiazole and benzo thiazyl disulfide have been found to be satisfactory accelerators of vulcanization. However, accelerators such as tetra methyl thiuram disulfide—are breakdown agents for vinyl resin and should be avoided.

Compounds containing zinc are usually breakdown catalysts for polyvinyl chloride. However, zinc oxide may be used successfully for activating acceleration if the polyvinyl chloride is well stabilized and the zinc



6—Tensile strength of new material taken from calender at different temperatures

Table III.—Circulating Air Oven Aging Tests

	Compound A 100 parts Geon polyblend 500 × 329 and 10 parts basic lead carbonate	Compound B 100 parts Geon polyblend 500 × 329 and 10 parts basic lead carbonate and 1.0 part Agerite Stalite	Compound C 100 parts polyvinyl chloride (Geon 101) and 40 parts dioctyl phthalate and 10 parts basic lead carbonate	Compound D 100 parts polyvinyl chloride (Geon 101) and 50 parts tricresyl phosphate and 10 parts basic lead carbonate
PERCENT WEIGHT LOSS AT 212° F. AFTER:				
5 days	0.56	0.96	4.44	1.10
7 days	0.50	0.89	9.41	3.12
14 days	0.24	0.93	11.5	3.37
ORIGINAL				
Tensile strength, p.s.i.	1900	1840	3200	3275
Elongation, percent	470	485	305	295
100 percent modulus, p.s.i.	1425	1410	2160	2260
Durometer hardness, Shore "C"	70	65	72	70
AFTER 5 DAYS AT 212° F.:				
Tensile strength, p.s.i.	1930	1800	3100	3120
Elongation, percent	435	470	220	255
100 percent modulus, p.s.i.	1375	1300	2840	2425
Durometer hardness, Shore "C"	67	66	81	76
AFTER 7 DAYS AT 212° F.:				
Tensile strength, p.s.i.	2100	1920	3050	3200
Elongation, percent	435	460	225	280
100 percent modulus, p.s.i.	1400	1325	3025	2500
Durometer hardness, Shore "C"	68	70	91	86
AFTER 14 DAYS AT 212° F.:				
Tensile strength, p.s.i.	2200	1950	3980	3200
Elongation, percent	440	470	080	300
100 percent modulus, p.s.i.	1350	1225	...	2780
Durometer hardness, Shore "C"	68	67	85	78
AFTER 5 DAYS AT 250° F.:				
Tensile strength, p.s.i.	2000	2075	5600	2800
Elongation, percent	070	410	010	040
100 percent modulus, p.s.i	...	1300	...	...
Durometer hardness, Shore "C"	76	70	96	90

oxide is used in a concentration of at least 5 parts per 100 parts of polyblend. Even with these precautions, extreme temperatures experienced in extrusion and injection molding are to be avoided. It is important to note that zinc oxide is also an excellent pigment for improved sunlight resistance. Magnesium oxide is another activator which has been satisfactory for light colored stocks. For black stocks, litharge is the preferred activator. In general, vulcanization increases the tensile strength, modulus, hardness, abrasion and solvent resistance. Compression set and cold flow properties are decreased.

Processing of nitrile rubber-vinyl resin

This new method of blending vinyl resins and nitrile type rubbers is superior to the earlier mill mixing techniques requiring three separate processing operations:

1. "Breakdown" of the rubber on a cold mill.
2. Plasticizing of the resin on a hot mill.
3. Blending of the rubber and plasticized resin.

The use of polyblend eliminates these operations because the vinyl resin and nitrile rubber are thoroughly blended in the manufacturing process. Plasticizing on a hot mill is no longer necessary because an intimacy of dispersion is achieved such as could never before be obtained in working with the dry raw materials. Even improved mill mixing techniques, where vinyl resin and rubber have been mixed without benefit of liquid plasticizer, do not produce products comparable to those prepared by the polyblend method.

Polyblend can be placed on a cold mill where a smooth band forms immediately. No "breakdown" period is required as is the case with rubber alone. Polyblend acts like rubber during the mixing operation in that all compounding ingredients may be added on a cold mill.

When intended for use as a thermoplastic, polyblend must be heat-treated at some point in the processing operations. At temperatures between 300 and 325° F. the colloidal blend becomes a homogeneous plastic material and retains this identity from the moment when fluxing becomes complete. This thermal treatment converts the material from a soft, somewhat tacky and relatively weak rubber-like nature to a firm plastic with good physical properties. Polyblend has a rather remarkable property in that it can be calendered at the moderate temperatures used for rubber products after an initial heat treatment.

Like straight vinyl materials, polyblend can be processed at high temperatures to produce finished articles

7—This brief case has been calendered from polyblend

8—Another example of material is seen in shoe uppers

requiring no further heat treatment. It is recommended that a small amount of lubricant—such as lead stearate, stearic acid or paraffin—be added to polyblend to prevent the stock from sticking to the hot mill rolls. For ease of processing, the lubricant should be dispersed in the polyblend on a cold mill before the stock is placed on the hot mill.

Figure 2 (page 82) shows heat necessary for adequate fluxing of the resin and rubber. In this experiment, polyblend was milled cold and molded at various temperatures. A similar experiment was carried out in which the polyblend was first milled at 300° F. before the tensile sheets were molded. A graph of these results is plotted in Fig. 5. These two graphs reveal that heat is necessary for good physical properties, but it makes little difference whether heat is applied during a final operation, such as molding, or during a phase of processing, such as calendering or extrusion. Figure 6 (page 84) shows heat needed to obtain good calendered goods. Here a polyblend stock containing a small amount of lubricant was calendered at various temperatures. The sheets (0.015 in. thick) were taken off the calender, cooled and tested for ultimate tensile strength on a Scott I.P.-4 machine. The results show that temperatures above 300° F. at some point during processing operations are necessary for good physical properties.

Field of applications

The non-migrating, non-extractable, non-volatile nitrile rubber plasticizer used in Geon polyblend suggests wide applications in those industries that have had difficulty with the conventional plasticized vinyls.

In the electrical industry polyblend is adaptable to both jacket and low voltage primary insulation applications. As jacket insulation there will be no plasticizer migration to destroy the electrical properties of the primary insulation, a fact that has limited the use of straight vinyls. When used as low voltage insulation for appliance cords, polyblend again insures no ill effects from plasticizer migration attacking varnished surfaces. This one characteristic alone opens up an entire field of uses such as unsupported and supported sheeting for ladies' handbags and upholstery materials.

The shoe industry should be particularly interested in polyblend because now a material is available that is not affected by bonding cements. Two such uses are shoe uppers and shoe welt. Polyblend also is equal to the vinyls in embossing and press-polishing qualities, and actually gives a truer tone color than most vinyls.

Book bindings made from a thermoplastic are now possible with polyblends. This industry must employ a material that will have good adhesion and not attack varnished surfaces or books bound with pyroxylin coatings. A polyblend solution is easily prepared at room temperature, using standard equipment. In addition, polyblend gives unlimited color range, ease of embossing, good aging and flexibility. The vinyl inks have been found very satisfactory for polyblend.

Good adhesive qualities are important in coating fabrics. The use of polyblend base coatings improve the adhesion of liquid plasticized vinyls to fabrics and other surfaces such as paper, wood and metal.

With proper compounding, polyblend stocks are superior to tricresyl phosphate plasticized vinyls for dimensional stability after aging at high temperatures. Thermoplastic tubing and hose can, therefore, be made which retain their shape and, in addition, do not become stiff because of gradual extraction of plasticizer. Such tubing can be used for transferring beverages, gasoline, oils, solvents and industrial chemicals.

Where high strength, better compression set, better heat resistance and greater resistance to solvents are required, it is recommended that polyblend be vulcanized. Printing roll covers, gaskets, valve disks, football and basketball covers are typical uses.

Ingenuity in finding outlets pays off

The way to mass sales is often roundabout. In this case, beauty shops led to department stores

Cellulose acetate is used for all eight parts that comprise this combination cigarette case and compact which also has such accessories as a flashlight, lipstick brush, cigarette lighter

Parts for two of these units are produced at one time in three molds. Bodies are molded in a 2-cavity die, the lids in a 4-cavity mold, the remaining caps and button in a 10-cavity die

THERE is no hard and fast rule for successful merchandising. This is shown by the sales pattern that had to be devised to bring a cellulose acetate compact combination to a cautious market.

The product, known as "The Glamor Kit," had to make its way in through the back door. To prove its worth to department store buyers and to the public, the salesmen of Revell Plastics, a division of Precision Specialties, 210 N. Western Ave., Los Angeles, Calif., turned to beauty shops and, through them, chalked up an enviable sales record that will open larger fields for future campaigns.

Molded of Lumarith or Tenite, this combination kit is an heroic effort to organize a woman's purse. In the one unit is included a compact, cigarette case, lighter, lipstick brush and a flashlight for making up in the darkness of a movie house, automobile or night club.

By the time Precision Specialties brought the Kit to the production phase in March of this year it had surmounted a number of difficult engineering problems, but a formidable job remained for Revell Plastics who was to put the kit on the market. Both the public and store buyers had been offered such an array of different make-up kits of every quality gradation that they had grown weary and wary of them.

First step was to work out a plan whereby the product could be tested, its appeal to the consumer adequately measured, its performance checked in actual use. A natural market and perfect field laboratory was in the beauty shop, where the operator could talk about and demonstrate the kit.

The manufacturer's sales representatives sold several beauty shops directly and instructed the operators in the proper methods of presentation. When repeat orders came in, it was easy to sell the idea to the beauty supply jobbers, so long as their sales forces could be properly trained.

Dealing with only a few beauty supply jobbers in

the California area, the manufacturer carefully watched the performance of the product, looking for problems to solve before attempting larger markets. But what started out to be a proving-ground turned into the real thing. Repeat orders flocked in until the limited laboratory market of the beauty parlors came to absorb the entire output of 7,000 a month.

Using the evidence

The next step was to approach department store buyers, overcoming any reluctance on their part by the substantial evidence of successful marketing in the beauty shop field. Now Revell Plastics plans a national promotion campaign that will include wide advertising, display cards, leaflets for department store distribution and other hard-hitting, energetic devices. But all of these might well have fallen flat, were it not for the adventurous merchandising that amassed the solid evidence of salability in the beauty shops.

Yet no matter how sound the selling approach, it hinged on the fact that the kit was well engineered and properly molded of the right plastic material. Three dies were used in the manufacture of this Lumarith or Tenite combination compact:

1. A 2-cavity die which makes two complete bodies is shown at top of the parts pictured on page 87. Inserts which form the threaded inside portion of the body are removed by an automatic reversible air screwdriver. Because of its size this mold can only be run on the company's 12-oz. Lester-Phoenix press.
2. A 10-cavity die for the molding of two complete sets of caps for the lighter, lipstick brush and two ends of the flashlight compartments and two pushbuttons.
3. A 4-cavity die for the molding of two cigarette and compact compartment lids. These last two molds are run either on the 12-oz. press or on an 8-oz. Reed-Prentice machine.

The kit resembles an ordinary compact save that it has two cylinders at either end. In one cylinder is the all-purpose flashlight. In the other cylinder is the lipstick brush at one end; the cigarette lighter at the other. If you flip open one side you have the compact. Flip up the other and you have your cigarette case.

It was a difficult product to make and to style. It would have been difficult to sell if the men, whose job it was, did not step out adventuresomely into new fields to prove the merits of their product.

In so doing they proved a point for the industry.

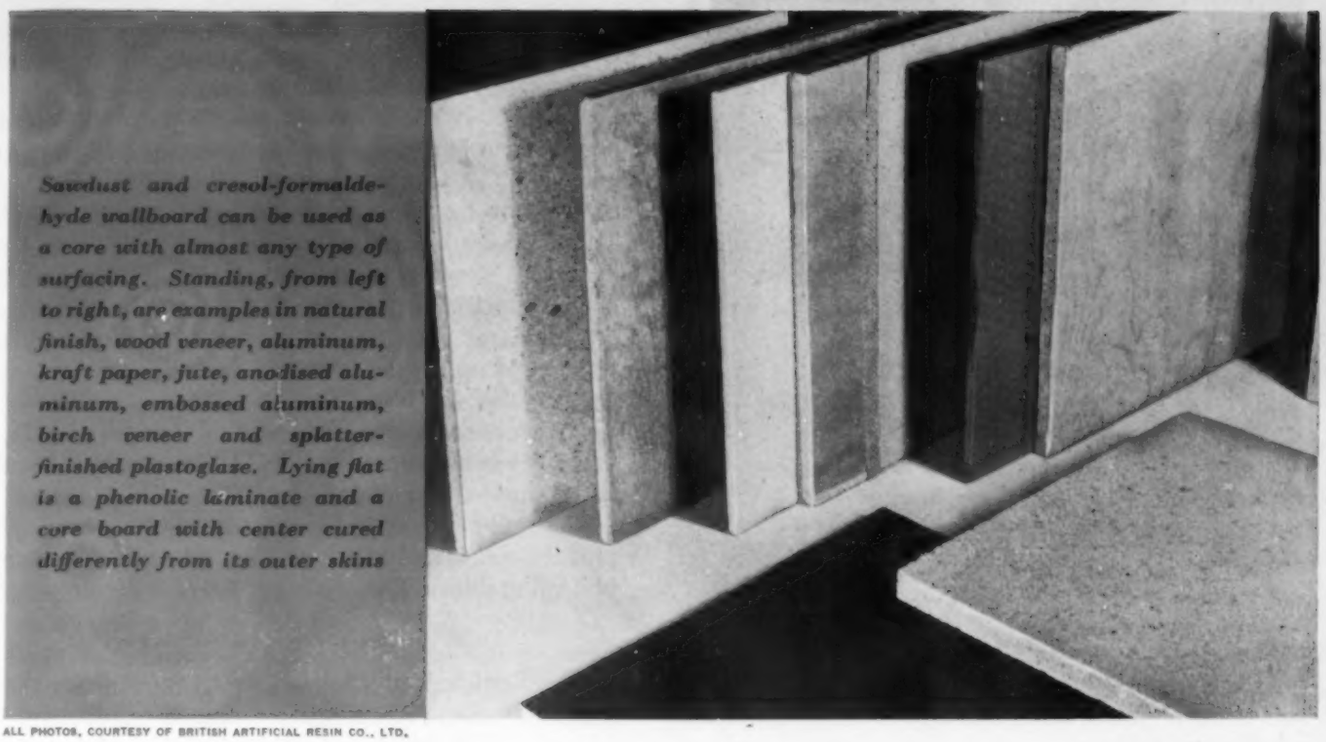
A NEW WALL PAPER WITH AN 0.00088-IN. thick acetate lamination was shown last month by Richard E. Thibaut, Inc., New York decorators, in conjunction with the Plastics Div. of Celanese Corp. of America. The Lumarith film is cast and then laminated to the paper.

Not only does this coating over the wall paper protect the paper from stains but it leaves no sheen. It will retail for around $3 a roll. This price is higher than the average wall paper but lower than that of some of the other specially processed papers.

Main outlets

It has been recommended especially for hospitals, hotels, apartment houses, powder rooms and places where the walls frequently need scrubbing. Demonstrators at the showing of this paper used soap and water to remove crayon, lipstick, ink and other stains without damage to the paper. It is credited with having withstood 250 strokes on the same spot. When soap and water does not do the job, carbon tetrachloride is generally effective instantaneously without any damage to the paper. Developers claim that the advantage of using cellulose films in this application is that it can be laminated to the paper without strain.

This new wall paper is the result of eight years of research. During the war, this work produced a film covering to protect maps, documents, labels, shipping tags and blueprints against weather and to provide a smooth surface for easy writing. Before the war ended the correct formula had been developed and experts in laminating and adhesives began to study the technique of applying it to wall paper.



Sawdust and cresol-formaldehyde wallboard can be used as a core with almost any type of surfacing. Standing, from left to right, are examples in natural finish, wood veneer, aluminum, kraft paper, jute, anodised aluminum, embossed aluminum, birch veneer and splatter-finished plastoglaze. Lying flat is a phenolic laminate and a core board with center cured differently from its outer skins

ALL PHOTOS, COURTESY OF BRITISH ARTIFICIAL RESIN CO., LTD.

Continuous structural board from sawdust

In Britain a continuous board of sawdust and cresol-formaldehyde promises to meet shortage of wallboard and laminate core material

THE NARROWEST bottleneck constricting the ambitious programs of British high pressure laminators is the shortage of timber, plywood and other core materials with which to back their products.

This scarcity of timber and of plywood has directed attention to a host of waste materials for bonding into boards. One of the earliest of these synthetic resin boards was Plimber (plastic timber), a product of urea-formaldehyde and sawdust.[1] Experiments have been made in Britain with peat, coconut shells and even pine needles. But up till now all these boards have been made to fixed dimensions dictated by the size of a mold or a platen. Though some of them are low priced, they do not offer the economies inherent in a process of continuous automatic production; several of them fail, from the laminator's point of view, because they cannot support the pressures required to surface them with a veneer or a skin, whether the skin is a metal sheeting, wood veneer or a high pressure laminate.

The answer to both these problems appears to have been solved by a new process developed by the British Artificial Resin Co., Ltd. The process is now out of the pilot plant stage and into semi-mass production.

[1] "Plastics in Britain's postwar homes," MODERN PLASTICS 23, 108–110 (March 1946).

The continuous press, devised by this company in collaboration with Dr. V. E. Yarsley, British plastics consultant, will produce a board of a predetermined density and thickness continuously at the rate of 2 ft. per minute. The production process is basically the same whether the board is to be a straightforward wallboard to compete with the fiber and plaster boards at present on the British market, or a core material for high pressure laminates.

Making up and blending compound

The raw materials in both cases are sawdust and a cresol-formaldehyde resin in the approximate ratio of 90 percent sawdust to 10 percent resin. The sawdust used is classified as coarse and semi-coarse. This means that the particles in the board are of fairly uniform dimensions and do not include large chippings.

The first process is to mix the powdered resin with pre-treated sawdust in a specially designed blender. Blending takes place over a period of 3 to 4 min. though (as is the case throughout the production of these boards) the blending process is continuous and automatic, the materials being fed in at one end of the blending machine and removed at the other, ready for loading into the

Used as a core in sandwich structures, this sawdust and resin board can be cured for varying periods, depending on the intended use of the finished laminate. At left is a fully cured and compressed board with a high pressure laminate surface. At center are two core boards with 50 percent cure sandwiched between outer skins having 75 percent cure. At right is a built-up wallboard with medium density center and high density outer plies

hopper which is located above the main production unit.

Because the resin and sawdust are mixed as dry powders, the chemical process of hardening the resin with heat and pressure is scarcely affected by different types of wood. This contrasts to processes where the wood is impregnated with a solution or aqueous dispersion of the resin. In these cases the resin is very sensitive to pH effects, and the source of wood must be carefully chosen, certain species being necessarily excluded.

Processing the blend

From the hopper the pre-mixed sawdust and resin is gravity-fed, still in powder form, onto a slow-moving conveyor belt. To insure even distribution of the sawdust over the face of this conveyor belt an automatic vibration feeder shakes out a controlled quantity of the mixture. When the standard $\frac{1}{2}$-in.-thick wallboard is in production, the sawdust mixture is built up to a depth of 1 $\frac{3}{4}$ in. across the face of the conveyor belt. This thickness differential indicates the amount of compression undergone in the later stages of production.

The conveyor belt next carries the sawdust and resin through a radio-frequency-heated field. Here the temperature of the mixture is raised to 125° C., a heat not sufficient to make the resin flow but enough to give a dough-like consistency to the mixture.

The mixture then passes through the continuous press, which for the production of wallboards is kept at a temperature of 165° C. and exerts a pressure of 200 to 300 p.s.i. The pressure channel in the press combines stationary and movable platens, and is heated by infrared lamps.

For ease of handling and decorating, the standard board is sandwiched between two sheets of absorbent paper which have been previously coated with a resin adhesive. The bottom layer of paper is fed onto the conveyor belt before it reaches the sawdust chute. The top layer of paper is fed into the machine after the loading of sawdust by the automatic vibration feeder. The board thus leaves the continuous press securely protected on both faces. A recent addition to the machine allows for the folding of a surplus of paper over the edges of the board to give additional protection. These edges can later be trimmed off if required. The final process in the production of this continuous board is the automatic cutting to predetermined lengths.

The semi-mass production unit shown on these pages produces a board 18 in. wide. The full-scale production unit will produce 48-in. board at 2 ft. per minute.

Anticipated future refinements

The British Artifical Resin Co., Ltd. envisage that ultimately one operator will be able to control three fully automatic production units from one control panel. It is also planned that these boards may eventually be produced with a surface facing of low pressure laminates. This refinement will have to wait in England for the perfecting of low pressure resins. At present any finished surface required for the board must be applied after the board has been cut to length. As already mentioned,

First step in production of these boards is mixing of sawdust and powdered resin in blending machine

the application of veneers, metal or high pressure laminates to these boards demands veneering pressures.

Varying degree of cure for core material

The inventors, with an eye to production economies, considered that a saving could be effected in the production of boards for these core materials by controlling the cure of the boards. It was realized that the final stages of cure could as well be affected by the heat and pressure involved in the application of the veneers or laminates as in the continuous press itself. Therefore, a special grade of board for core materials is being manufactured by the same process. These core boards are in the form of a sandwich with over-all thickness varying between 1/2 and 2 inches. The center of this sandwich leaves the press with a 50 percent cure, while the outsides are given a 75 percent cure. These variations are produced by controlling the application of the radio frequency and infrared heat—less radio frequency heat is applied and more infrared. Infrared heat advances cure of outside surfaces without reaching center.

Production of this core material is also a function of the pressure. Whereas the wallboard is produced under 200 to 300 p.s.i. the core material passes through the press at only 50 p.s.i. Lighter and therefore cheaper presses are being built for continuous core board production. Density and final cure are then provided in the platen presses used for applying veneers or other surfaces. A core material which leaves the continuous press with a thickness of 3/4 in. will be reduced under veneering pressure of the press to half that thickness.

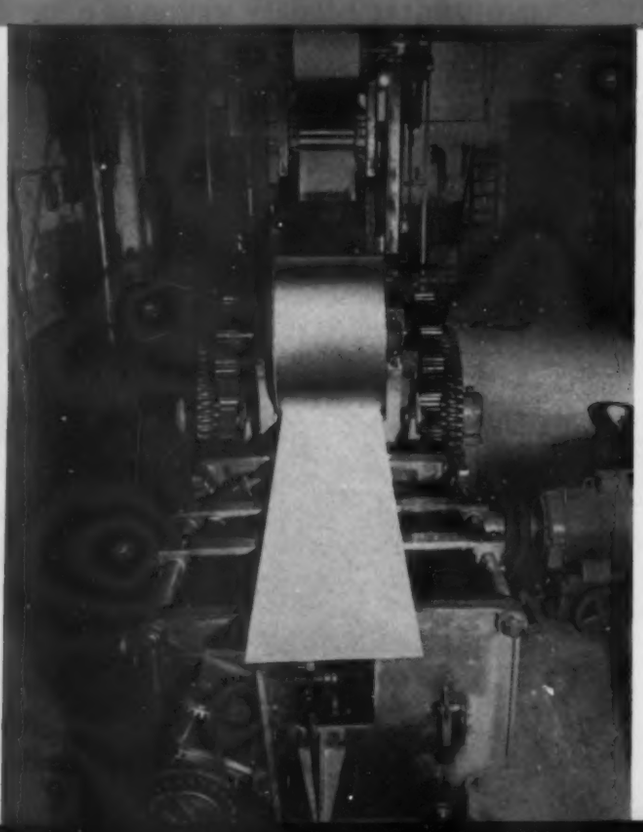
Apart from the economies involved in this method of producing core material, the inventors kept in mind two further advantages. The first is the avoidance of breakdown in the core under laminating pressure, a failing experienced with many waste product boards. The second is the possibility of a high pressure laminator being able to lay up his impregnated sheets on top of this semi-cured core. By so doing he may produce in one process a high pressure laminate already backed with a cheap core board. The polymerization of the laminate and the final polymerization of the core will take place at the same time and will effect the bond, without the necessity of a secondary gluing process.

Stands up under tests

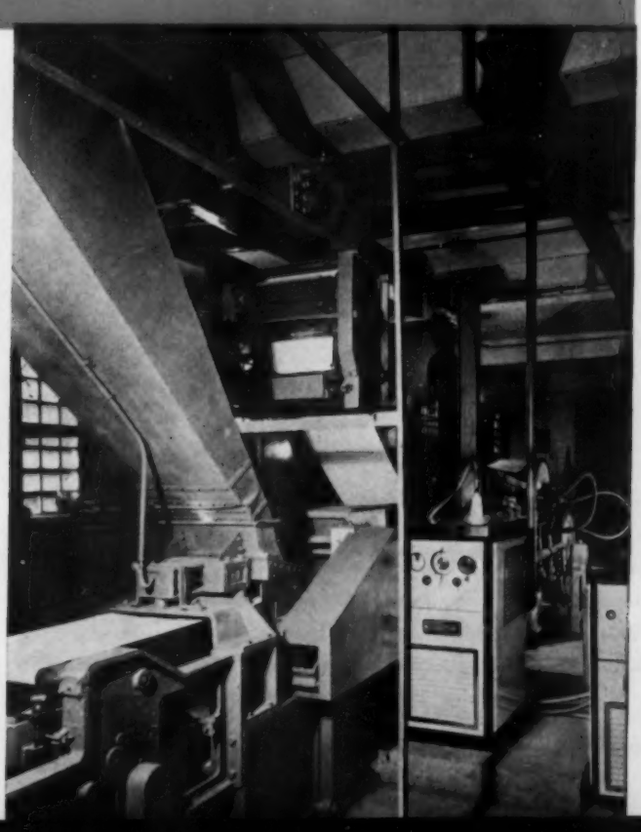
A wallboard made from this composition has been tested by the British Government Building Research Station and found to compare favorably with fiber boards on the British market. In strength and deflection under load, samples met the requirements of British Standard 1142. In the spread-of-flame test the board was graded Glass 2 which makes it acceptable for use in escape passages as well as in living and bedrooms. The water absorption test indicated that for the present it is fit for interior applications only.

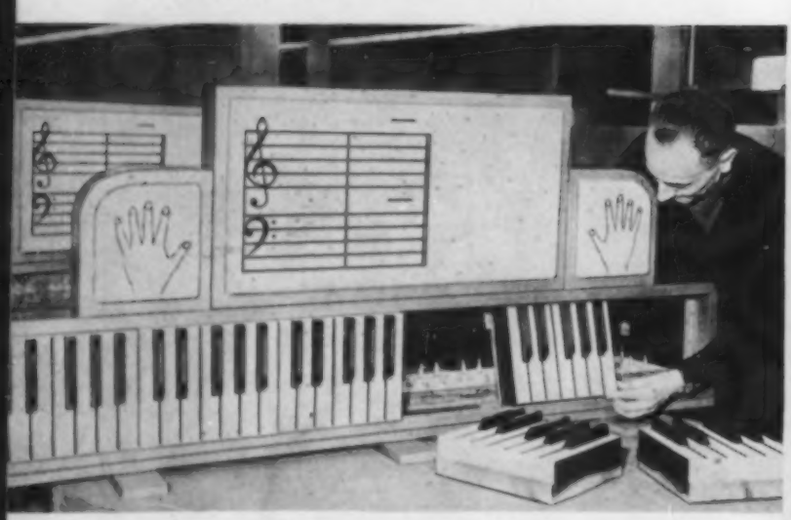
The British Artificial Resin Co., Ltd., will offer the press to other building board manufacturers both in England and abroad under license. The company itself will not try to satisfy all the British home market.

While the heated mixture flows into the press from the chute, top layer of protection paper is also fed into it



Down the chute comes mixture into the press. Finished board is shown as it approaches cutter





The master replica, wired to instructor's piano, is of urea formaldehyde. Staff and hand panels of acrylic are controlled by keys of polyester-type resin (right)

Plastic teaching aids invade piano field

Through the use of a plastics device, children can learn to play tunes visually without need for piano

A VARIETY of plastics—acrylic, polyester resin and urea-formaldehyde—are used in a new device for instructing a group of students in piano simultaneously. While this method of instruction, which requires only one piano, was originally developed in 1927, extensive use of plastics is a recent innovation.

This aid, put out by Educational Methods, Inc., of Wilmington, Del., consists of: 1) an enlarged master replica of the real piano keyboard made of urea-formaldehyde; 2) a staff panel of acrylic; 3) a hand panel of acrylic—all three of which sit on top of the teacher's piano in plain view of the student; 4) a wooden control cabinet with polyester resin keys fastened below the keys on the real piano; and 5) polyester replicas of the keyboard for the students.

As the teacher plays a piece on the real piano, the keys on the master keyboard light up, showing the student the proper note to strike on his dummy keyboard. To accomplish this, a contact bar is placed across the keys inside the piano. Each key is then wired to the corresponding light on the instructor's master board.

By using the control cabinet keys, the instructor can light up the proper playing fingers on the hand panel and identify the notes, timing and key on the staff panel.

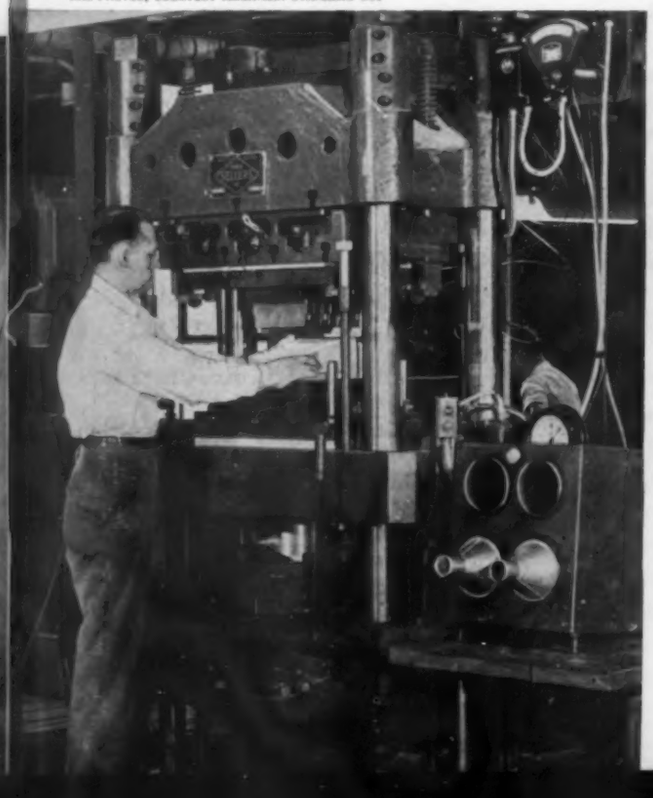
Master Plastics, Inc., 32nd & Miller Rd., Wilmington, Del., molds the white keys for the control cabinet of polyester resins. Synvar V-30 is the most frequently used base in the compound. This company first planned to cast the keys but because of breakage found it necessary to mold them. Previous experiment had indicated the possibility of devising a compound using polyester resin in combination with filler for a form of compression molding. It was a fairly simple matter to modify the three single-cavity steel molds, which were designed for casting, so that they could be used for molding.

The staff panels and hand panels are formed by Keystone Plastics Co., 3 S. Princeton Ave., Swarthmore, Pa., of Plexiglas. These panels, along with control cabinet keys, are silk screened by West & Myers of Wilmington, Del., and shipped to the plant where assembling of all parts takes place.

Beetle plastic was selected for the master keyboards because of its translucence, moldability, color and general appearance. Too, the master keyboard required a thermosetting material which would not soften under the heat of electric light bulbs.

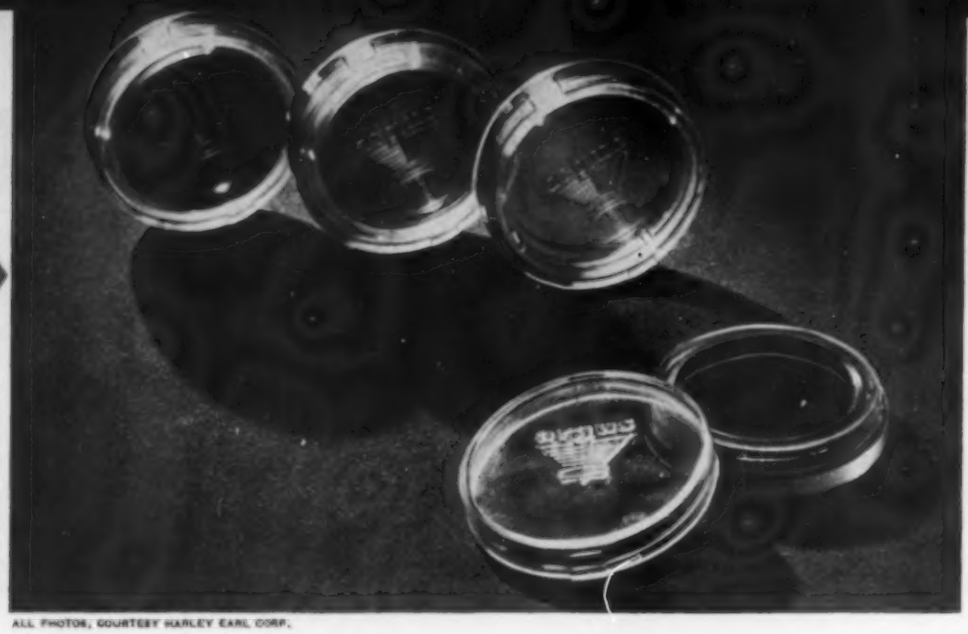
One keyboard consists of six separate octaves which are later fitted together. These octaves are molded by Penn-Plastics Corp., Glenside, Pa., and weigh 3 1/4 lb. each. Rotary can prewarming of white urea-formaldehyde is used. Minor keys are painted black.

ALL PHOTOS, COURTESY AMERICAN CYANAMID CO.



A complete octave is removed from press (left). Later it will be finished (above) and fitted six to a keyboard. Minor keys, molded as part of octave, are painted black

1—Lens filters can easily be identified without removal from the box thanks to these injection molded containers of clear cellulose acetate



ALL PHOTOS, COURTESY HARLEY EARL CORP.

by J. G. BALMER, JR.*

Styling a prerequisite to selling

The aim of today's designers is toward more sensitive use of the style potentials that are inherent in plastics materials

PRODUCT improvement—both mechanically and appearance-wise—under pressure of increased consumer discrimination, has once more become a vital factor in the maintenance of sales in a competitive market. Today manufacturers are faced with a need for much closer cooperation between all agencies contributing to such improvements, from the drawing board to the retail counter. Industrial designers, working with new applications for plastics, can help assure better customer acceptance of a product by encouraging more of this kind of cooperation, stressing correct choice of the plastic material and sensitive skilled use of its design potential.

The role of the product designer

The product designer's responsibility can too often be regarded by others as merely a visualization of the product as a pleasing object (or organization of parts) in its final form, followed by the selection of a material from which it is to be made. Proper selection of the material best suited for the job, *in combination with functional design which takes advantage of the inherent style possibilities of the material*, is a more reasonable approach in development of a better-looking product.

The relation between the design of an article and the material to be used in its manufacture is obvious. Limitations vary with the specification of material. However, plastics in particular have many properties, other than technical ones, that should be considered in styling, though the aim of product styling which skillfully utilizes these other properties is not always carried out. It is evident that often a property in certain plastics—transparency, for example—is over-emphasized or misused. Superfluous use of this quality with disregard of the material's reflective characteristics has sometimes cancelled it as a material advantage.

Experience has shown that no one material is readily adaptable to all design needs and, similarly, that no single quality in a material is a cure-all for the widely varied styling problems of the industrial designer.

Usually the basic reasoning behind most proposed product improvement, such as styling, is to better satisfy the desires and demands of the buying public for better products and, thereby, increase sales. Since consumer appeal, whether visual, tactile or psychological, is the key, contributors to product improvement involving proper use of plastics should consider properties the consumer accepts as genuinely desirable.

Known and unknown plastics properties

Today, those properties which are quickly recognized at point of sale are mainly visual and tactile. Unfortunately, the lay public has yet to be adequately informed as to the great differences between the various types of plastic materials. To alleviate this situation, physical and chemical properties, mechanical advantages, etc., must be put across, for the most part, by

* Harley Earl Corp., 5533 Woodward Ave., Detroit 2, Mich.

2—Jewel-like refractions of light are obtained in this two-piece injection molded desk clock case through the use of acrylic. Base of the clock may have frosted finish

3—Polystyrene battery case of this flash gun attachment is injection molded with side grooves to give firm grip. Bulbs are ejected by pressing release button at top

labels, illustrations, demonstrations, advertising copy or through familiarity of the individual with such features through past experience with products made of the material in question. Too few tradenamed plastic materials are well known through this latter process. Despite wide use of the various synthetic materials they are often referred to merely as *plastic* by the public, with that general classification as a basis for approval or prejudice.

The plastics industry is faced with a large task in the promotion among the masses of a better knowledge of its various materials and a simplified understanding of their basic differences.

There are, however, a number of qualities of plastics which the consumer readily notices and responds to in purchasing plastic products. These might be listed, generally, as follows:

VISUAL—line, form, color, pattern, transmission of light (i.e., transparency, translucency, opacity), reflection of light (shiny), absorption of light (dull).

TACTILE—shape (in handling), weight, temperature, elasticity, consistency (hard or soft), texture (smooth or rough).

These recognized qualities are all-important in catching the eye or in creating the point-of-sale impression upon the buyer. Other features, many of which have psychological appeal—washability and resistance to wear, for example—are equally important in merchandising but are not quite so obvious without proof by testing.

The manner in which the visual and tactile attributes of a plastic material are employed in the styling of a product can make it appear ugly or handsome, fragile or durable, old fashioned or up to date, cheap or valuable. In this respect they indirectly affect the consumer's decision to purchase, either by discouraging or creating a desire to own, use or display. For this reason, more consideration of better product appearance on the part of engineering, production, assembly and merchandising groups and greater cooperation with the industrial designer in achieving that aim, is in the best interest of better business.

However, the achievement of greater aesthetic appeal is only one of the problems which designers seeking new uses for plastics are now studying. The illustrations accompanying this article show some of the results which the staff of one organization, the Harley Earl Corp. of Detroit, Mich., has developed for several manufacturers in aiming at better use of plastics in new products.

Four design histories

The plastic lens-filter box, designed for Argus, Inc., Ann Arbor Mich. (Fig. 1), has improved function and appearance through use of transparent material. Lens filters, which come in various colors and sizes, can easily be identified without the necessity of the box being opened and the filters handled, or the use of markings on the box. In addition, the filters serve as colorful backgrounds for the redesigned trademark, which is molded into the top half of the box. Threading has been minimized and the entire package has been kept thin with the circular faces slightly concaved to facilitate handling and carrying and to allow for stacking which clears the raised trademark. Boxes come in two sizes, in $1^1/_2$ and 2-in. diameters, and are injection molded of Lumarith by Michigan Molded Plastics, Inc., of Dexter, Mich. The threads, incidentally, are stripped from the mold before the material has set.

The flashgun attachment for small and candid cam-

4—Both the insignia and letters are engraved in the back of this transparent acrylic crest piece which is used to keynote a twin-deck card box recently placed on the market. The back is then gold-plated

5—Playing card case itself is post-formed of low-pressure laminated material, simulating leather. The lid is black, the bottom gray with gold metal molding crimped to the edges

eras (Fig. 3) was also designed for Argus, Inc. The battery case is of molded polystyrene with a smooth black finish. Firm handgripping is provided by form and design treatment which avoids application of minute rough textures that have at endency to diminish the characteristic luster of the material. Pressure on the flush release button bearing the trademark ejects the flash bulbs after use. Terminals which synchronize the flash with the shutter mechanisms are located at point of attachment on the bottom of the case. The parts are being injection molded by the Continental Can Co. of Cambridge, Ohio.

In the styling of a distinctive executive's desk clock, the Chronomaster (Fig. 2), for the Jaeger Watch Co., 304 E. 45th St., New York City, the reflective qualities of transparent molded Plexiglas are utilized to advantage in giving this quality product the desired appearance of a luxury item. Made in two parts, dome and base, the case is thick in its sections. The walls of both parts are curved and bevelled to afford facetted jewel-like refractions of light. The case houses a gold-finished mechanism which is visibly indicative of the precision and accuracy of the jeweled timepiece. Setting knobs are gold-plated and dials for hour and elapsed-time readings are of satin gold finish with black numerals and hands. The numerals and hand for calendar readings are in red. The clock is furnished with the base either frosted or transparent (as shown on Fig. 2). The parts were injection molded by the Sheller Mfg. Corp. of Portland, Ind.

The design (Figs. 4 and 5) for a new twin-deck card box for the Kem Plastic Playing Cards Co., Inc., 330 W. 42nd St., New York City, uses two types of plastic materials. The box itself was designed to be made of a low pressure laminate material with a finish similar to leather in appearance. The box half is gray; the lid is black with the colors set off by gold metal moldings crimped to the meeting edges. Fitted to an opening in the lid is a transparent Plexiglas Kem crest piece with insignia and letters engraved in the back and gold plated. With transparency localized in an eye-catching identification ornament, the package preserves the surprise element which makes it a desirable gift item for any occasion.

These designs are illustrative of the new and practical products embodying styling of a definitely postwar nature that can be achieved through the cooperation of industrial designers and far-sighted manufacturers. Products developed under such cooperation utilize the right plastic material to the fullest benefit of the maker, distributor and user.

It means a lot to plastics' future

Advanced designs have been delayed in reaching the market due to problems of reconversion, shortages of materials and fabricating facilities, and the gradual establishment of new molding and forming techniques. But, nevertheless, the advantage of this "thinking ahead" is proving itself as industry's problems approach solution. The product designer's contributions are of special significance in expanding the potential future market for plastics and in providing sound answers to the search for peacetime applications of wartime developments. By employing adequate design research and experimentation as part of this effort, misuse of new materials, such as experienced in the early days of plastics development, is being eliminated or is being greatly lessened.

Processing polyvinylidene chloride

For brevity the word Saran has been used here to describe the basic material though it is generally recognized as a trade name

PHOTO, COURTESY VISKING CORP.

One of the biggest markets for extruded monofilaments is in insect screening—a product introduced during the war for tropical installations. It was found more resistant than metal to weathering, humidity, fungus

EXTRUSION

THE extruding of Saran demands a difficult and precise technique, but once it is mastered and the necessary changes made in the equipment, extruders find that the material is well suited for fabrication into many forms by this process.[1] Saran is extruded in the form of rods, tubes and monofilaments. The greatest production is in monofilaments—National Plastic Products Co. of Odenton, Md.; Visking Corp. of 6733 W. 65th St., Chicago 38, Ill.; and Firestone Industrial Products Co. of Akron 17, Ohio being the biggest producers under the respective trade names of "Saran by National," "Viskord" and "Velon."

There are many tricks involved in this extrusion. However, the following discussion should give the reader a good idea of the steps involved.

[1] "Extrusion of Saran," by J. A. Palmer, MODERN PLASTICS 22, 141–146 (Nov. 1944).

At the proper extrusion temperature (324 to 350° F. according to operating conditions), Saran emerges from the extrusion die as a viscous liquid similar in viscosity to molasses. At that point it is an amorphous substance with the molecules in random arrangement.

Oriented tubing—In order to obtain great tensile strength these molecules must be stretched and caused to crystallize and assume an orderly alignment. This alignment (called orientation) is obtained by stretching after supercooling. The tensile strength increases lengthwise along the filament but decreases in the transverse direction. Consequently, piping is left unoriented; otherwise it would split too easily.

Dow Chemical Co. technicians point out that if the compound is thoroughly fused when leaving the extruder and immediately plunged into cold water there should be little trouble with orientation. This process

PHOTO, COURTESY DOW CHEMICAL CO.

This piping is produced by a modified extrusion process

is expedited by installing a 90° elbow on the head of the extruder so that the extruded material literally pours out of the extruder into a cold water bath. It is practically impossible to extrude monofilament on a transverse plane because the material is fluid and will not hold its shape. The purpose of the cold water bath (about 50° F.) is to retard setting up or crystallization of the monofilament until it is stretched.

The strand is drawn away from the die through the water bath at a uniform rate by means of a set of take-off rolls and then passed to a set of orienting rolls. These rolls, operating at differential speeds of about four to one, give the material its needed stretch and high tensile strength. Higher strengths are obtained in smaller strands by a more thorough supercooling of the material during the quenching operation. The larger sizes have a tendency to crystallize partially at the center with resultant lower tensile strength, but a longer immersion is helpful in improving strength.

Due to the heat sensitivity of Saran it is necessary to keep the volume of material in the extruder as low as is consistent with suitable operational characteristics. The extruder is much shorter than the type normally used in plastic fabrication. Volume is further reduced by use of a shallow flighted screw and a thin plastic layer through the final heating zone of the extruder. The extruder is streamlined to the greatest extent possible to prevent hold-up of material and to guarantee minute temperature control.

Unoriented tubing—When unoriented tubing is extruded a different technique is involved. The material is extruded downward at a 20° angle, and the tubing is given a hot water rather than cool water bath. In this case, the idea is to induce crystallization as soon as possible.

The big problem with tubing is to obtain uniform size. Saran tubing is extruded with the end sealed, and closely controlled air is forced into the mandrel from the extruder head to prevent the tube from collapsing. A non-uniform extrusion rate or non-uniform speed of the conveyor belt results in size variations.

Extruded piping and tubing is particularly applicable to chemical plants and airplanes because of its chemical resistance, transparency and the fact that it will not support combustion. It is also desired as a conductor for compressed air because of resistance to vibration and the ease with which the lines may be moved.

Modified extrusion of pipe—Saran pipe is manufactured by a modified extrusion process. A mandrel is passed through a crosshead die on the extruder and is coated with Saran in a molasses-like state. The mandrel is rotated and passes through two rollers. The first presses the material against the mandrel and controls the size; the second smooths out the surface. The pipe is then subjected to a die-drawing operation for sizing and surfacing.

There are certain things which Saran pipe does not pretend to do. It does not claim the rigidity nor bursting strength of iron or copper, nor does it pretend to withstand the temperature extremes of the metallic products. When used underground the material becomes brittle around 20° F. and is generally recommended for this use only in fairly warm climates where the soil is corrosive and damaging to other types of piping. However, Saran pipe is sufficiently rigid, has a bursting strength and resistance to temperature that adapts it for many uses. It is easy to install with Saran fittings and has excellent electrical characteristics.

MOLDED SARAN

Compression and injection molded Saran products have been slipping into the industrial stream quietly but firmly ever since the first years of the war. Because important fittings for machines needed in critical industries could be molded from this chemically resistant material the Government permitted its use despite the need for this plastic in actual war materials. It fitted in particularly well as a substitute for hard rubber, and in many chemically organic solvent applications it proved superior. Now that it is more available, Saran's use in those lines is expected to grow.

Compression molding

The Molding Corp. of America., Inc., of Providence, R. I., has made a specialty of compression molding thermoplastics, featuring Saran. Officials admit that this work requires special techniques but, having delved into the mysteries of Saran, they report that it is not so difficult to handle once the know-how is learned.

The primary problem, says Charles O'Koomian, chief technician of the company, is that Saran disintegrates when it reaches a few degrees over the critical temperature of about 300 to 320° F. and cannot be held at the critical temperature for many minutes. The technique is to get the temperature up as quickly as possible and then cool off the material before disintegration sets in.

Saran requires less pressure than most other plastics, and because of its extreme plasticity or fluidity is particularly adaptable to complex molds where it can be

expected to flow into minute or thin-walled sections without trouble. Another advantage is that thick- and thin-walled pieces can be efficiently molded in the same cavity without leaving sink marks because the outer surface of the molding stiffens rapidly by crystallization. Reheating of the outer surface by transfer of heat from the molten material in the interior of the molding does not soften the outer surface and allow shrinkage to occur there.

Cycle time for molding may be from five to ten times longer than for thermosetting materials with items left in the mold under pressure for from 5 to 30 minutes. The size of molded piece is only limited by the capacity of the press—articles of from 1 oz. to 25 lb. having been successfully molded to date.

Electric preheating has been unnecessary in past experience, according to a Molding Corp. of America, Inc., spokesman, but it has been reported that experimental transfer molding with dielectric heating has been done so quickly that the Saran melts uniformly without using up its thermal life. This quick action gives longer life to the material before it deteriorates and makes possible the molding of a thick section without decomposition in the center because of a slower cooling rate. Furthermore, special metals are not required for the molds in transfer molding.

Compression vs. injection molding—Technicians of the Molding Corp. of America admit that in many cases compression molding of Saran is not economically feasible in comparison to injection molding. There are, however, specific applications where compression molding produces a more satisfactory result. In such cases the customer expects to pay more for the initial installation but he also assumes that the long range cost will be less, due to the longer life or greater efficiency of the product he buys.

Some of the advantages claimed for Saran compression molding over injection molding by Molding Corp. of America officials are improved chemical and mechanical properties. They say compression molding will give a product with increased tensile strength. According to their tests Saran compression molded pieces will stand 20° more temperature, but injection molders disagree with this claim. Compression molding also improves chemical resistance, according to this molder, who asserts that the finished piece is less porous and the entire block is more dense. Injection moldings are sometimes harder on the outside than the inside.

Another big factor is that large parts beyond range of injection molding can be compression molded.

Selling compression molded pieces—Merchandising compression molded Saran pieces is no sinecure. The business of educating buyers that high initial cost is a saving in the long run is fine in theory, but purchasing agents are likely to be short on theory and hard bitten on immediate cost. If a small gasket costs $7\frac{1}{2}$ cents in another material and 20 cents in Saran there will be a tussle at the coin box to get that 20 cents unless the production engineers can convince their management that the 20 cent investment is in effect a saving. The key persons in selling Saran moldings are those who must use it in their equipment. Once they are convinced of its merit, the purchasing agent will become more amenable. When he can be shown that another type gasket may have to be replaced after five operations while a Saran gasket can be used 85 or 100 times, he will be convinced, but it may take several years of experience for Saran molders to prove their point.

The spinning buckets for textile machinery and dipping baskets for plating in the Molding Corp. of America's production line point up this cost angle. Thousands of each of these parts are currently used in industry. Metal buckets will not resist chemical corrosion; wooden ones absorb water; fiber-filled phenolic laminates and other plastics have given good results but the search is still on for a more perfect material. Saran compression molded buckets may be the answer. They have a tough, durable, rubber-like consistency; won't absorb water, have superb chemical resistance.

The dipping basket is even more applicable to Saran than the spinning bucket. It is a bucket-type form of about 2-qt. size, perforated with hundreds of holes about $\frac{1}{4}$ in. in diameter. Baskets used today are nickel plated, made of pottery or rubber covered wire mesh. Each mill wants a different pattern or size holes. Present buckets have to be replaced frequently due to chemical corrosion or breakage. Saran not only solves the difficulty of chemical corrosion and breakage in these buckets but it machines so easily that the drilling of holes individually or in a jig is a simple operation.

Machining technique—Like other molded plastics, Saran can be easily turned, drilled or sawed on ordinary cutting machines and, in addition, is comparatively easy to weld. The handle on the dipping basket is set into two attachments or blocks of Saran which are welded to side walls. Generally, welding may be accomplished by any one of several methods. The

In textile machinery such as this dipping bucket, polyvinylidene chloride is superior to pottery or wire mesh

PHOTO, COURTESY MOLDING CORP. OF AMERICA

blocks may be welded with a rod of Saran of the same composition and softening point as the pieces being joined, a hot air torch being used rather than direct flame since the direct flame is likely to locally overheat the material. Or, the rod may be rotated at about 5000 r.p.m. with a high-speed drill press or hand drill while light pressure is applied. It is possible to lay down several beads on the same seam.

The blocks may also be friction welded since this plastic is readily melted by the heat developed between two parts which are rubbed against each other at suitable velocity and then forced together with sufficient pressure. This method is adaptable to cylindrical parts or disks which can be rotated against one another in a lathe or other suitable device. Still another method is hot plate welding whereby the heat is applied to surfaces to be joined by bringing those surfaces into contact with a heated hot plate and retaining them there until an inventory of molten material is built up. When heat softened, the materials are removed, joined together and held firmly in position until cool.

Experiments with valves—An item with which there is a great deal of experimentation at present is a Saran molded valve. To date Saran tubing has been made and used primarily for chemical lines but never for a valve. The Molding Corp. of America has perfected and patented a diaphragm-type valve as well as gate or globe air-tight and foolproof valve requiring no packing. It is contemplating production of these in $1/2$, 1, $1\,1/2$ and 2-in. sizes. Use of these valves made from Saran in acid and chemical plants greatly improve efficiency and effect tremendous savings because there will be no maintenance cost. The cost of the new Saran valve is higher than a metal valve but its length of life because of its chemical resistance will be much longer. In fact, it will last as long as Saran pipe with no repairs or replacements.

An interesting sidelight in connection with Saran valves and joints used with Saran pipe or tubing is that in many cases no washer of any kind is necessary because the material can be squeezed together tightly, so that leaktight junctions are formed. For ammonia, acetylene, oxygen and other gases the Saran valve will not be affected and is leakproof for long periods.

Injection molded polyvinylidene chloride industrial parts

PHOTO, COURTESY AMERICAN HARD RUBBER CO.

Compression and injection molded sheets

Still another interesting Saran application, both compression and injection molded, are flat sheets from $1/16$ to $1/2$ in. thick. The largest compression molded sheet to date is about 24 by 24 in. in size. Injection molded flat pieces are generally about 6 or 8 in. square.

These flat sheets are used primarily for lining metal tanks used in the chemical and electroplating industries. Such linings are, of course, much more costly than lead, glass or other common coating materials but they last indefinitely and are not subject to breakage. However, one processor points out that they are uneconomical on small tanks, that the thin injection molded pieces sometimes have pinholes and that it is difficult to make them adhere to metal side walls of the tank.

Saran blocks or plates are easily welded together along the edges of tanks. If thicker sheets are desired, the pieces may be literally melted together on the flat surfaces. Typical are several 8 by 8 by $1/4$ in. injection molded pieces welded together to form a 32-in. square about 3 in. thick and weighing around 100 pounds. A liner machine from this block has been used for the discharge line of a centrifugal pump in a sewage disposal system where it has resisted attack by sticks, stones and chemicals for more than a year and is still on duty with no noticeable wear. The bronze liner that was formerly used lasted only about three months.

Injection molding

Injection molding of Saran while more common than compression molding is still in its infancy. One of the earliest injection molded Saran products was a handle for paint spray guns, an application where the material's resistance and lightness (the specific gravity of Saran is 1.7) are important.

Conditions of injection—Injection molders of Saran meet many of the same equipment problems faced by extruders, namely, heat control and need for the use of alloy metals. Non-catalytic alloys must be used for the injection chamber and molds—Hastelloy B or Z-nickel being recommended as the most satisfactory for general all-round use though other special alloys can be used for more limited service.

The heating chamber of an injection press running Saran should have the plastics section only $3/16$ in. thick in comparison to the $1/4$ to $3/8$ in. thickness most commonly used. The machine should be thoroughly streamlined with no ledges or obstructions that might hinder flow of the compound. Good zone heat control is essential and four control spots are generally employed instead of the three commonly employed for other materials.

The material enters the machine at from 275 to 330° F. and reaches a temperature of from 325 to 350° F.

at the front. If overheated the material will decompose, so as low a heat head as possible is recommended. The Dow Chemical Co. recommends a nozzle heater and points out that if the temperature drops 5° below the proper range the Saran may freeze in the nozzle because of its tendency to crystallize.

In contrast to other thermoplastics, the molding cycle for Saran may be faster in some cases if the mold is kept warm. Through the use of mold temperature control, recrystallization may be accomplished at the maximum rate and molded parts may be ejected without damage or warpage at rapid cycles. Moldings with a 1-in. cross section which require cycles of up to 7 min. when other thermoplastics are used have been successfully molded at 1-min. cycles with Saran. Cycles possible in molding thinner sections will compare favorably with other thermoplastic materials. Thin sections require warmer molds to help hasten crystallization. Thick sections do not usually need this heat application in order to crystallize.

After molding, the items are frequently placed in an oven at 178° F. for 24 or 48 hr. (depending on thickness) for crystallization to accelerate development of maximum tensile strength. This gives the parts added physical strength—particularly impact and tensile.

Properties of injection molded parts—The finished molding resists flow up to within a few degrees of its molding temperature and has unusually good weld strength at the joints. It is dimensionally stable except for contraction and expansion similar to that in metals when subject to sudden temperature changes. It weathers well except for a slight darkening from continuous sunlight and has excellent water resistance. Saran moldings are not recommended for uses involving resistance to high speed impact or shock resistance at sub-freezing temperature nor for applications requiring continuous exposure to temperature in excess of 170° F. Electrical properties are of high order. The molded pieces have a tendency to become brittle at temperatures below 20° F., but improvements are being made in impact resistance at low temperature.

The American Hard Rubber Co. of New York City is one of the pioneers in Saran injection molding, having for years engaged in the molding and extruding of hard rubber and thermoplastics. When rubber became impossible to obtain, the company turned to Saran for its small moldings used in chemical and textile plants.

Among the most interesting of these pieces is a small spinnerette coupling which holds the platinum spinnerette used in rayon mills. It's just a small 2-oz. square coupling about $1^1/_2$ in. square made in two parts that screw together, but rayon mills couldn't operate without it or a substitute. The old rubber coupling never lasted long—it was attacked by carbon bisulfide and palmitic acid in the spinning bath and went to pieces. But the rayon industry found that the new Saran couplings never seem to wear out—the acids have no effect on them. They cost three times as much but seemingly last forever.

The pieces of this coupling are molded in an 8-cavity

PHOTO, COURTESY DOW CHEMICAL CO.

Multi-cavity injection molding of polyvinylidene chloride

die—four complete couplings per mold. (It is shown in right lower corner of picture on page 100.) An 8-oz. press is used with cycle time of $1^1/_2$ minutes. Screw threads are molded in. The molder reports that, when injection molding Saran, it is best that full shots be taken. If he is using an 8-oz. press and the molded piece is only 5 oz. his practice is to inject the remaining 3 oz. as a separate chunk or waste. The waste can be regranulated and used again. However, the amount of regranulated scrap used in a compound should not exceed more than from 10 to 30 percent.

There are scores of small items similar to this coupling, including gasket holders and valve seats for a water chlorinator, which are intended for use where chemical resistance, lack of water absorption and lack of flammability are important.

The biggest piece the company displays is a 2-in. 90° elbow for piping (see picture on page 100). The company explains that the threads were molded in but could easily be machined with standard cutting tools except that the rake of the cutter must be less pronounced because the slanted angle used in cutting other materials would cut too deeply into Saran.

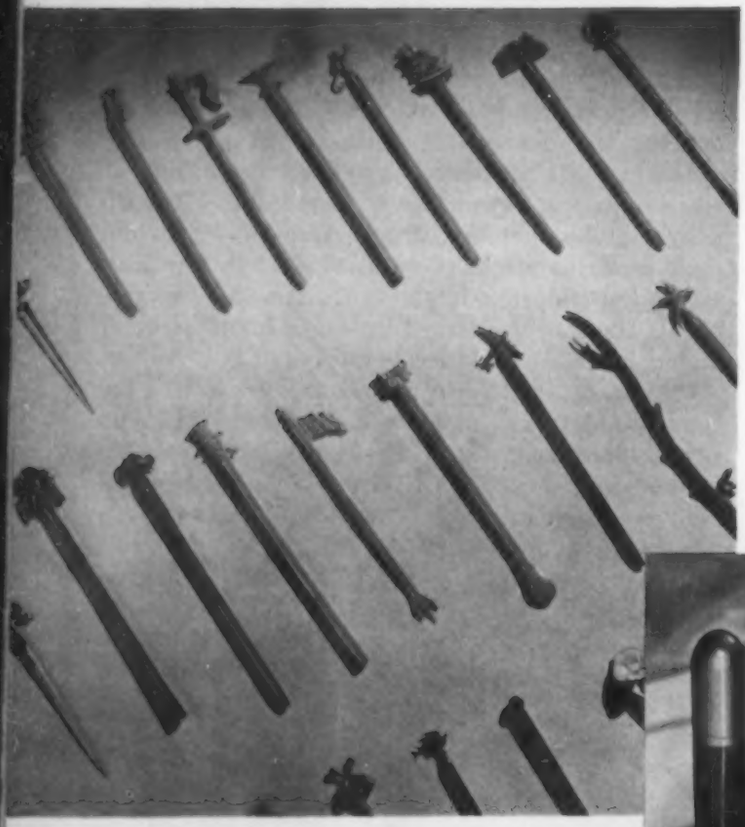
Other items injected by various molders include the cap in a nasal spray which is an example of thick and thin molding in one piece and points up Saran's possible use with medicines because of its resistance to various type of oils and aromatics. Another unusual job is a cushion plate for steel rule dies. This product serves a similar purpose to the maple block that is used in paper cutting machines to receive the knife. Saran forms a soft but firm base for the knife or die to rest upon after it has cut through paper, leather, wood or what not. Its developer believes it will outlast a wooden cushion plate by many months.

Saran producers never expect their material to replace other thermoplastic molding powders in great quantity but they believe experience and education will convince many customers that for scores of specialty purposes Saran molded jobs are economical investments.

Keeping youngsters cool and happy in their own back yard is easy with this new wading pool made of Koroseal. Lack of structural reinforcement is safety feature. Pool can be folded into small package, stored for any length of time

Good visibility coupled with safety are advantages of this Goldigger type magnetic grip shield made in two pieces of Plexiglas or Lucite by Fabri-Form Co. for Dilley Mfg. Co. The safety hood is of clear acrylic, while the bottom or tray is fashioned of blue acrylic sheet

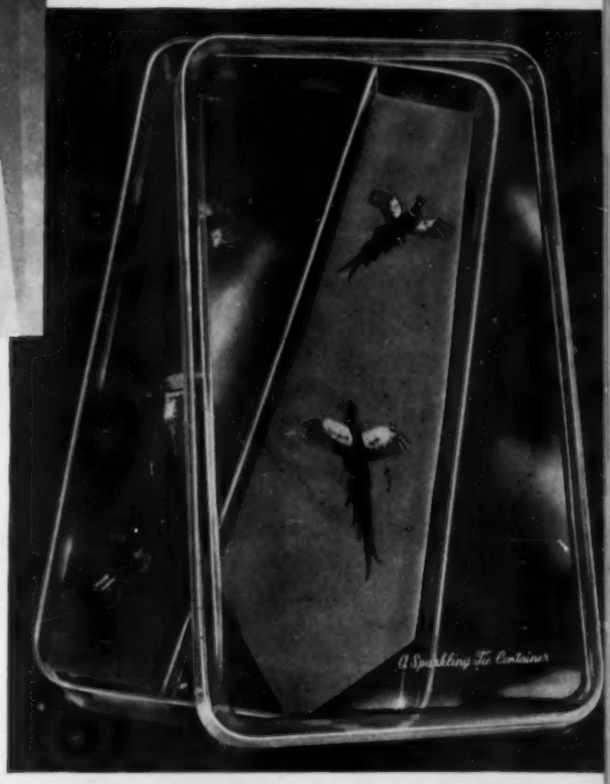
PLASTICS



Colorability, formability, resistance to the effects of alcohol and breakage, and low cost all work to the advantage of plastics in applications like these cocktail picks and muddlers. These items are all injection molded of cellulose acetate by Gits Molding Corp.

This Atomette perfume dispenser, no bigger than an ordinary lipstick, holds a dram of perfume. Inner glass vial is set in black phenolic case and topped by gold-plated or white Plaskon cap. Northwestern Plastics Co. molds these plastic parts for the Atomette Co., Inc.

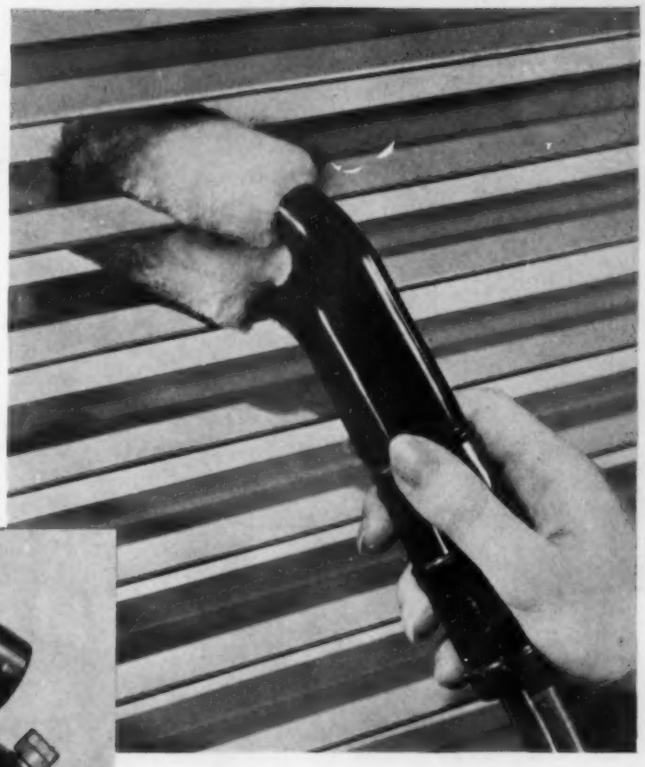
Good impact and abrasion resistance are among advantages Bakelite gives to the shuffleboard disks molded by Dimco Plastics, Inc. The disks also resist friction, weathering, maintain momentum



Making a good play for the sportsman is this tie container drawn from sheet stock of cellulose acetate, cellulose nitrate, Tenite II or Lucite by Shoe Form Co., Inc., for Raefleman's. The inner divider is inserted after box itself is completed. Gold leaf is applied by embossing iron

...TS PRODUCTS

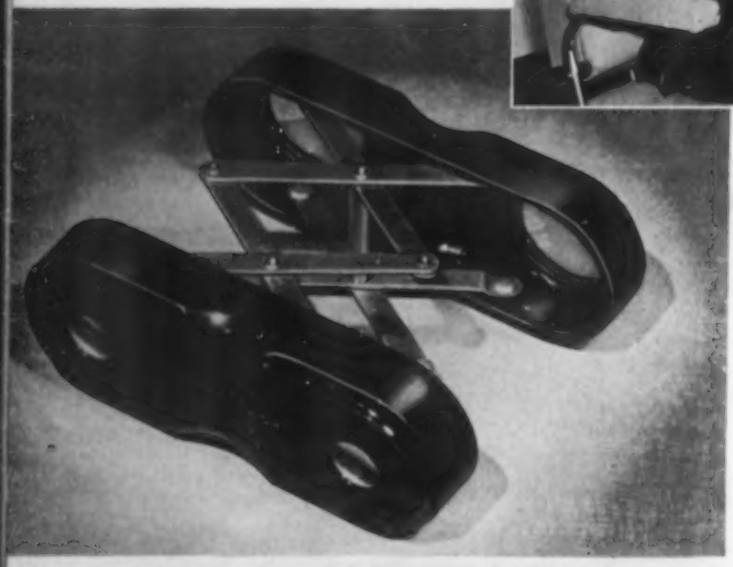
Toughness, light weight, finish led to use of Tenite II for vacuum-cleaner attachment for Venetian blinds. Kuhlman Plastics Co. molds unit for Fuller Brush Co. Tubular section branches into two prongs covered with lamb's wool. Dust is sucked into slots in prongs



Graceful Plexiglas carrying handle and supports, fabricated by Kent Plastic Corp., add a modern decorative touch to new Torpedo aerosol sprayer made by Sanitary Aids Co. Pilot light beneath front of handle causes the handle to light completely when unit is plugged in

Addresses of firms mentioned here are given on page 158

Cleanliness is essential in beauty parlors, yet but little time can be spent on cleaning. Decorative Micarta for the walls solves this problem since it is easy to clean, resists chemicals. Here a tan-linen pattern is used

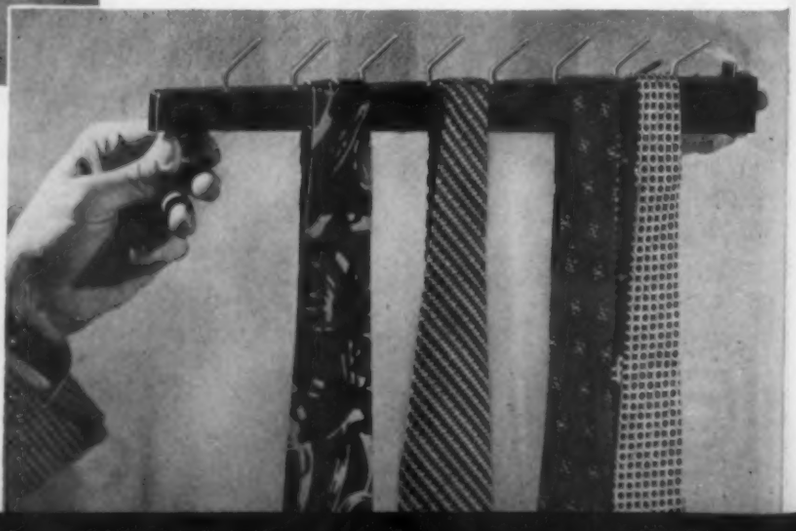


These handy binoculars, manufactured by Porto-Sight Co., fold into vest-pocket-size unit. The frames are injection molded by Elmer E. Mills Corp. of black and white polystyrene, selected because of its freedom of design, ease in sealing in lenses and its light weight

PLASTICS

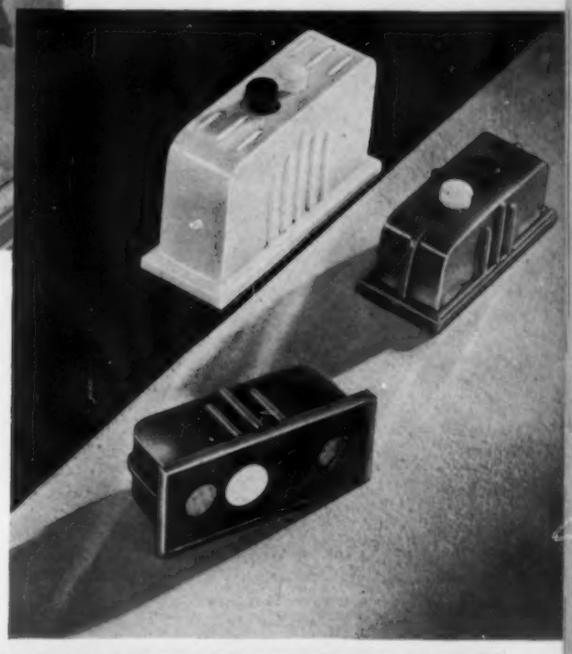
Addresses of companies mentioned on these pages are given on page 158

The family Bible can now be kept free from moisture and dust in this Styron container which was chosen for its low cost and clarity by World Publishing Co. Molded by Plastic Engineering, Inc., the lid and base have step joint for positive location, easy removal



Variegated mahogany or oak effect is given these tie racks through the use of Tenite II. Designed by Barnes & Reinecke, Inc., molded by Continental Plastics Corp. for Jackson Mfg. Corp., these Ty-Matic racks have the advantage of being light weight, having no splinters to pull or tear ties

This adjustable bottle holder, a product of Faries Mfg. Co., is an extra pair of hands to a busy mother, for it holds baby's bottle firmly with no danger of slipping. Sleeve holding bottle is of crystal Lustron molded by Grigoleit Co. The arm is chromed metal



These attractive two-in-one dispensers for salt and pepper are available in a table model size and in a smaller individual size. They are molded of Tenite in a 10-cavity die by Anfinsen Plastic Molding for Love-Bird Products Co. and come in ivory, green, blue, red as well as yellow

S PRODUCTS

This shatter-resistant Celcon holder keeps baby's bottle and its contents safe and sanitary on picnics or on trips. It is injection molded by Arnold Brilhart, Ltd. Band on center section retards rolling, gives good grip

Polystyrene's color range led to its use in these coasters molded by Cambridge Molded Plastics Co., for Thomas A. Steeds Co., Inc. Box is acetate

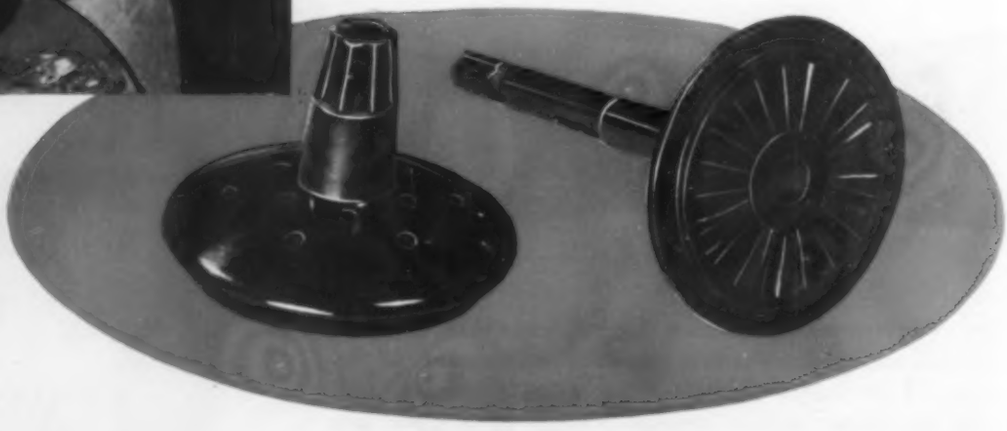
3 plastics add to

PHOTO, COURTESY CLUB ALUMINUM PRODUCTS CO.

A plastics success story—with melamine, phenolic and polystyrene playing functional and decorative roles for which each is ideally suited. Thus might be summarized the numerous plastic applications in the postwar line of coffee makers, other top-of-stove glass cookware and related products being made by Club Aluminum Products Co., located at 1250 Fullerton Ave., Chicago 14, Ill.

Prior to the war, this well-known cookware manufacturer had confined its use of plastics essentially to knobs and insulators for aluminum ware. When manufacture of these products was discontinued due to material shortages, the company introduced a line of "heat-resist" glass utensils with cold-molded plastic handles of stock design.

The company has now redesigned its entire glassware line, and employs plastics for water spreader and



Made of melamine plastic, the filter disk and spreader plate (at right) of this new coffee dripolator are odorless, tasteless and undamaged by constant use in boiling water

Identical plastic handles are fitted to all three coffee-makers in this line. Another design is used for the sauce pans and double boilers; a third for tea pots. All are phenolic

beauty, usefulness of cookware line

Use of melamine, phenolic, polystyrene in this line was result of careful tests in comparison to non-plastic materials

filter disk in its drip coffee maker, for bowl covers and handles and for parts of the coffee dispenser.

From the standpoint of function, the outstanding application in the complete line is the melamine unit used in the four- to eight-cup drip coffee maker. As shown at left this assembly comprises two parts—the perforated water spreader, which permits boiling water to trickle down through the coffee, and the filter disk through whose radially disposed slits the brew passes into the lower bowl.

Selected after tests with urea and high temperature phenolic, melamine was found to be ideal for this purpose because it most successfully met the rigorous service requirements, and is odorless and tasteless. Engineers of the cookware company estimate that water poured into the upper bowl of a coffee maker has a temperature of around 205° F.

Advantages of melamine

The melamine water spreader and filter disk assembly parallels an assembly of substantially similar design made of ceramic material. Its advantages over the former, as given by company engineers, include:

1. Use of the plastic material permits a design in which the stem of the filter plate is sufficiently long to be grasped by the housewife in inserting and removing the assembly from the upper bowl.

2. The lighter weight of the plastic components is an added measure of protection to the glass bowl in case assembly should be dropped and fall against it.

In using the drip coffee maker, the housewife grasps the filter disk unit by its handy stem and inserts it deep into the upper bowl where it seats against a shoulder at the bottom of the bowl. Then she measures out the coffee and places it on the filter disk.

Next, the hollow stem of the spreader is slipped over the projecting rod of the filter disk, and the spreader is rotated slightly in either direction, locking it in place so the two parts may later be withdrawn as a unit. This locking action seats the filter positively against the top shoulder of the upper bowl and prevents the spreader from rising out of position in water.

Boiling water, poured into the top bowl, drips through the openings in the water spreader passing through the coffee and on into the lower bowl. Openings in both plastic parts are accurately dimensioned to provide the best rate of water passage for correctly brewed coffee. The fact that the entire assembly may be removed easily simplifies disposal; grounds are lifted out directly on the filter disk. (*Please turn to next page*)

Phenolic is used for bowl covers (lower left). One is designed to hold bowl during measuring. A companion dispenser (lower right) is operated by a mechanism whose parts are injection molded of a black polystyrene

Circular openings in the water spreader and tapered radial slots in the filter disk are molded in, and a thin film of plastic at the bottom of each is easily removed after molding. The undercut which provides the locking feature on the filter disk stem is fabricated by a lathe operation.

Phenolic for bowl covers and handles

An odorless and tasteless grade of phenolic material is used for the upper and lower bowl covers of the new coffee maker. The lower bowl cover is a snap-on type with a flat spring which engages the rim of the glass bowl. The upper cover, designed with a stem, also serves as a stand in which to place the upper bowl while measuring coffee into it and, too, when it is removed from the lower bowl after coffee has been made.

The three coffee makers in the line have an identical handle design. A different style of handle is used for the sauce pan and double boiler, while a third design is employed for the tea kettle and tea pot. The handles, which are notably sturdy and comfortable to hold, are from the drawing board of Dave Chapman, Chicago designer, who styled the Club Glass postwar line.

All these handles are of general purpose phenolic and are transfer molded. There are 4-cavity dies for each type of handle used; any two of the molds may be run simultaneously in the same press.

Polystyrene for the coffee dispenser

Thermoplastic materials are used for a companion product—an attractive coffee dispenser which holds 3 lb. of coffee and measures out the proper amount for one cup each time the control lever is actuated. Parts for the dispensing mechanism, formerly made of chrome-plated die castings, are now injection molded of black Lustron instead.

Molded parts for the patented dispensing device include the circular outer housing, the rotor (which travels in an arc when the dispenser is operated), the "half moon plate" which holds the coffee back over the opening, and the agitator bar.

Each injection cycle produces a complete set of these parts in a 4-cavity die. After removal of gates, the components are combined in a smoothly functioning unit by means of a heavy, chrome-plated combination handle-and-assembly-pin passing through the center.

Through four holes drilled around the outer housing, the dispenser is fastened directly to the lithographed metal canister by means of Phillips head bolts and nuts, resulting in a permanent, tamper-proof assembly.

FOR CLEAR AND EASY DEMONSTRATION, the Appliance Corp. of America, Milwaukee, Wis., has taken its new Akka automatic washing machine out of its customary metal cabinet, and enclosed it in Plexiglas. Not only is the outside enclosure made of the transparent plastic, but three other parts of the mechanism had to be fashioned of acrylic as well to permit observation of the full operating cycle.

Besides exterior cabinet and hinged lid, two halves of the washing chamber sphere and perforated inner door are also of acrylic. Not only for its transparency, but for its toughness, ease of fabrication and light weight was the plastic chosen.

All plastic parts were fabricated by Midland Plastic, Inc., 227 N. Water St., Milwaukee 2, Wis.

The acrylic has to withstand considerable oscillation, vibration and pressure which are involved in the machine's operation. The sphere in which the clothes are washed oscillates 144 times per min. through $1/4$ revolution. To press out the soapy water, fresh water at 150 p.s.i. is introduced between the bottom hemisphere and a rubber liner, which forces the clothes against the perforated top of the sphere.

The machines will be displayed in department stores throughout the country.

Laminates important to textile machines

NEW applications of plastics to textile machinery are announced every week. And, as might be expected from the history of textile machinery, many of the new plastics developments are the result of continued research by the high pressure laminators.

A case in point is the work of the Formica Insulation Co., Cincinnati 32, Ohio. This firm uses fabricated high pressure laminates—both flat and tubular; compression and transfer molding; and combinations of laminating and molding, to produce the items illustrated at right.

Figures 1 and 2 show an assembly and an exploded view of an up-cap twister.[1] The function of the unit is to put the final twistings in yarn after the initial twists have been put on either by a spinning bucket or by the spool method. The bowl (Fig. 1, also Fig. 2, at left and in cross section at top) is pressure molded from macerated materials. The cap (right in Fig. 2) is similarly produced. The stem is transfer molded from macerated material.

Another interesting textile machine part is the molded spool bobbin (center, top in Fig. 3). The feature in this piece is the fact that the laminated heads are molded integrally with the macerated barrel to prevent the yarns from being caught in winding or unwinding.

Twisting caps (left front in Fig. 3) whose functions are to retwist or complete the twisting of once-twisted rayon yarns are made by combining laminated material on the rims and macerated material in the center. The advantage of using these caps lies in their ability to be dynamically balanced, their retention of high edge polish over a long period of time and their lightness in use on the machine.

Yet another part is a spool body for twisting a cake of rayon yarn (front right in Fig. 3), produced from cotton-base material. Here the advantages of plastics are light weight, smooth surface, resistance to wear and acid fumes.

Transfer molded parts

An example of a transfer molding is the twisting bracket frame (center right in Fig. 3). This part can resist acid attack, is dimensionally stable and is easily removable for replacement or alteration because of the triangular bevel and the bracket base. Another transfer molding is a gear roller (center right of Fig. 3) used to actuate the spool body. This piece is made from a cotton-base phenolic material.

With high standards of performance in their products and materials, and with an increasing versatility in the use of various methods of molding, laminating and fabricating plastics, the high pressure laminators are making tremendous strides in putting plastics to work for the textile industry.

[1] "Plastics improve textile machinery," MODERN PLASTICS 24, 76 (July 1947).

1

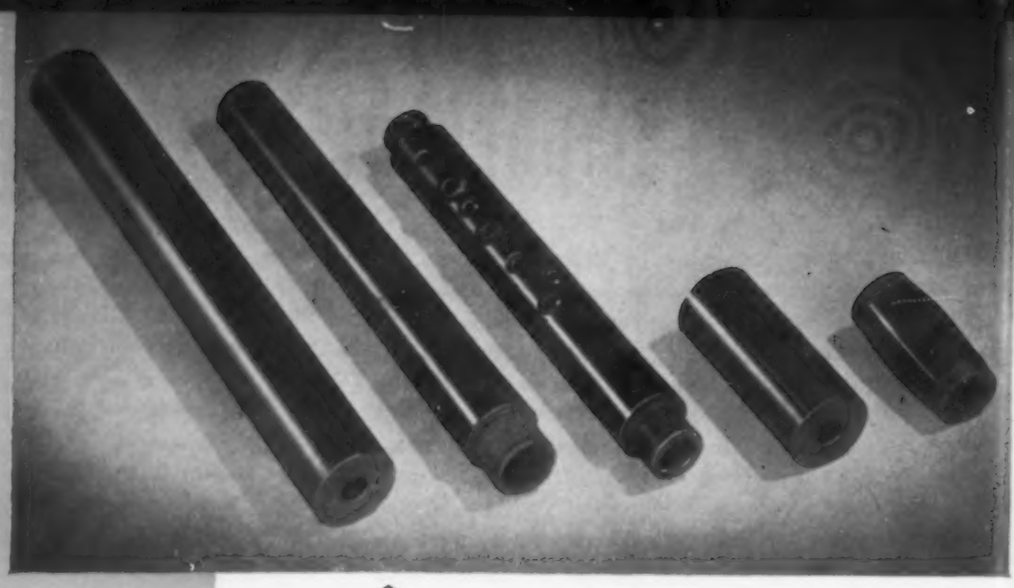
1—This up-cap twister is used to put final twistings in yarn after initial twists have been put on. 2—An unassembled up-cap twister is shown below. Bowl, at left and in cross section at top, and cap are pressure molded from macerated material. Stem is transfer molded of the same type material

2

PHOTOS 1 AND 2, COURTESY FORMICA INSULATOR CO.

Other laminates employed in the textile industry include twisting caps, spool body, bracket frame and gear roller

3



The three pieces at the left and the two sections at extreme right show steps in machining two pieces of extruded phenolic to shape demanded by clarinet design

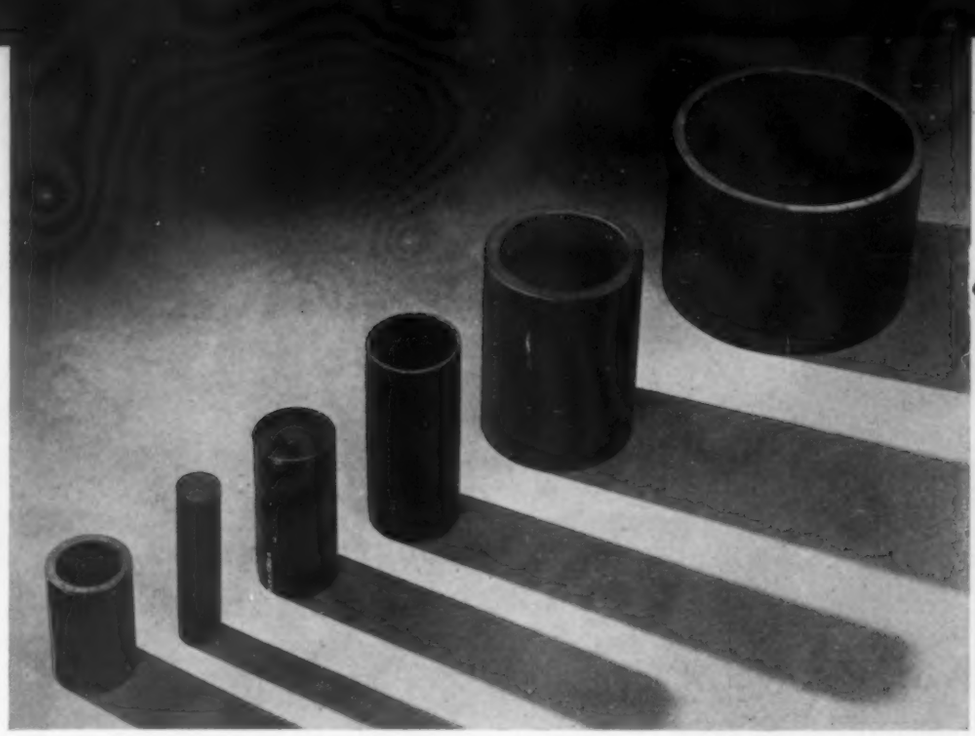
Clarinet of machined

WHEN TESTS, made by Badger Plastics, 121 N. Eighth St., Sheboygan, Wis., indicated that their thick-walled phenolic tube extrusions were capable of withstanding hard knocks, sudden temperature changes and prolonged exposure to moisture, it was decided to use the material in the precision clarinets manufactured by W. R. Yerke, Paoli, Ind. A general-purpose, woodflour-filled Bakelite BM 14316 was selected as it machined well, and the woodflour content, when extruded under the high pressure and heat used in the company's presses, resulted in a product approaching the expensive Grenadilla wood from which the highest quality clarinets are made. Samples of extruded paper-filled Bakelite BM 1914 have also been tried, and this formulation may well be the material finally used since it has high impact strength, good machinery qualities and excellent tonal qualities.

Advantages of extrusions in clarinets

The fact that the phenolic extrusions are tough is important since orchestras give clarinets a lot of hard use. Hard use in metal instruments often cause denting, bending and even splitting—catastrophes that do not happen with the plastic instrument. Temperature changes are bound to occur when transporting instruments from indoors to out, and if they are not able to stand up under these variations, shrinkage and warpage may occur as with hard rubber and wood.

As for moisture absorption, it can cause the greatest of catastrophes—primarily because the instrument is subjected to a certain amount of moisture during use. The plastic clarinet, by not absorbing moisture, assures



Musical instruments such as clarinets are but one promising outlet for extruded rod and tubing. The versatility of this plastic form is increased by the variety of wall thicknesses and diameters in which it can now be made

extruded phenolic

Plastic lends strength, moisture resistance, good tonal quality to instrument

dual protection against shrinkage and warpage and, of course, eliminates the problem of corrosion which can take place in metal instruments.

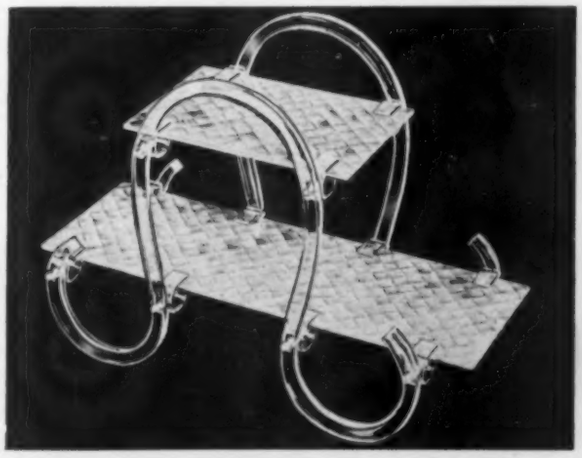
The clarinet has been given further tests to establish its playing and tonal qualities. Here the manufacturer found that the phenolic instrument excels metal and rubber instruments and compares favorably with those of Grenadilla wood.

Until a year ago, extruded tubes for this clarinet were produced on an experimental basis. However, the kinks have all been worked out, and production is now possible.

To transform the tubing into a clarinet, the manufacturer takes the tubing and reams the center hole to the correct size. A lathe is used to turn barrels, upper and lower joints to the desired outside size and taper, and to sand the material, turn ends and make preparations for ring and cork joints. The upper and lower joint of the clarinet are placed in a drill press so that the tone and knob holes can be drilled. While in the drill press, the knob holes and socket holes are tapped and the hard rubber plugs screwed in, drilled and milled. After this process, knobs are screwed in their proper position and drilled, the keys fitted.

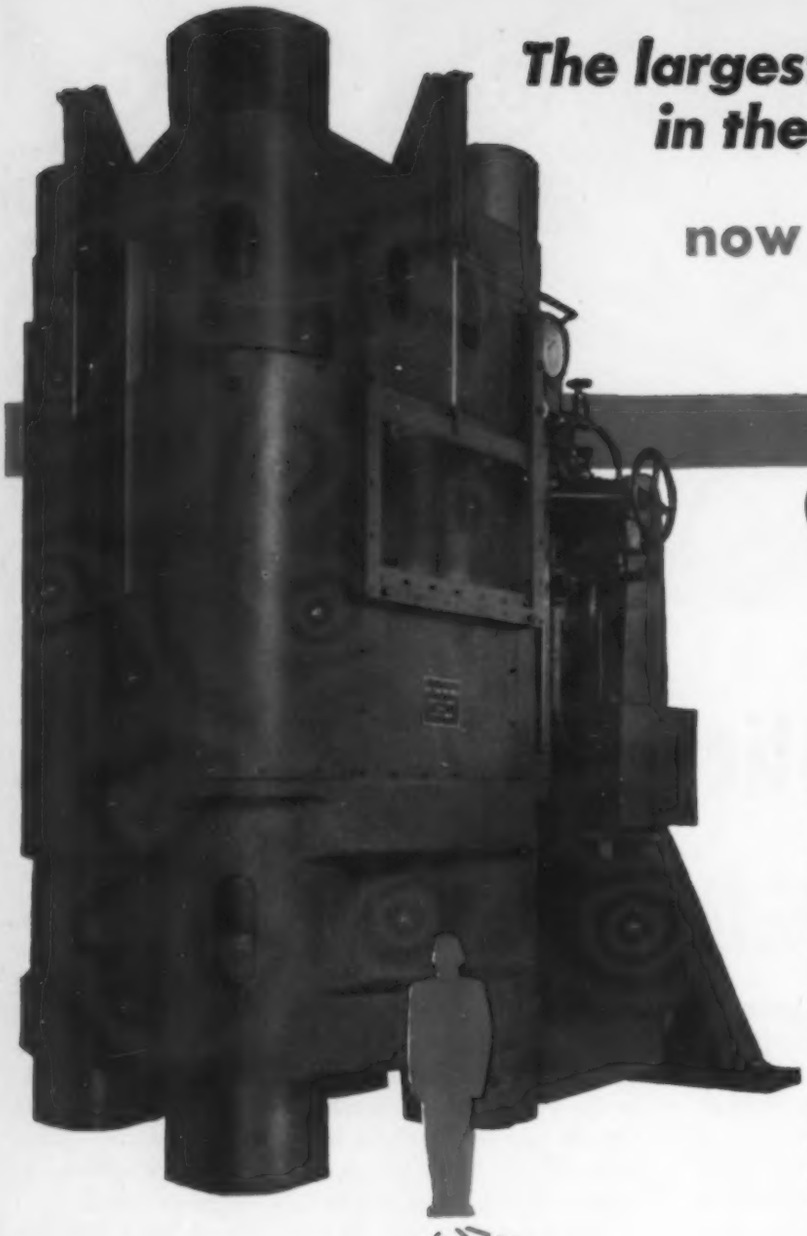
The extrusions used in this clarinet are but a few of the many sizes and shapes being produced by Badger Plastics. A few other products are shown above.

AN ALMOST UNLIMITED NUMBER OF surface designs are available in a new line of display fixtures introduced under the name of Leeplax by Lee Plastics, A & Lippincott streets, Philadelphia 34, Pa. The Leeplax fixtures are clear, shatterproof glass laminated to Di-Noc, a cellulose nitrate base film. The film patterns come in various colors and include full-color reproductions of natural wood grains, marbles, leathers and artificial textures. Any two designs can be combined in a rigid reversible shelf. Single patterns can be produced in flexible sheets. The Leeplax shelves can be combined with acrylic uprights to form different types of displays.



The largest hobbing press in the plastics industry

now producing:



Hobbed Cavities *by* Midland . . .

An important addition to Midland's expanding facilities is this 8000 ton hobbing press, the largest of its kind in the plastics industry.

This mammoth press with a ram diameter of 39½ inches makes it possible for Midland to hob cavities of approximately 80 square inches . . . almost tripling former hobbing limits.

With this press, Midland is prepared to supply plastic molders with hobbed cavities for large plastic parts including radio cabinets, large container escutcheons and instrument housings. Multiple cavities can be hobbed . . . "like peas in a pod" . . . quickly, with complete uniformity and accuracy. Multiple cavities will speed up your production with a minimum of expense.

Midland experience and facilities, in addition to skilled craftsmen, are ready to serve you . . . to produce the finest and deliver on time when you specify "Hobbed Cavities by Midland."

Write for your copy of "How to Heat Treat Hobbed Cavities," a practical heat treating treatise to help you get the best performance from Hobbed Cavities by Midland.

Cavities for: Radio Cabinets — Escutcheons — Instrument Housings

MIDLAND DIE AND ENGRAVING COMPANY

1800 W. BERENICE AVENUE . . . CHICAGO, ILLINOIS

Makers of Plastic Molds ★ Die Cast Molds ★ Engraved Dies ★ Steel Stampings ★ Hobbings ★ Pantograph Engraving

3 plastics make new compass possible

There are eight plastics parts in this unit—three are of phenolic, four of vinyl and one of acrylic

A NOTEWORTHY advance in compass design and the suggestion of a number of new heretofore untouched outlets for plastics are the direct result of the thoughtful use being made of three plastics materials by Kelvin and Wilfrid O. White Co., 90 State St., Boston, Mass., in its new Corsair compass which is shown below in Fig. 1.

There are eight different plastics parts in the compass—three are phenolic, four are vinyl and one is acrylic. The design of one or two of them became practicable only after plastics were decided upon, being too involved for economic manufacture in any other material. In the case of another part, the inner bowl, the special compass fluid which insures uniform performance of the instrument can be used because the phenolic from which the piece is molded could be specially formulated to withstand the effects of the liquid. Again, it is the unique properties of vinyl which make possible the dual function of the inner bowl—as a container for the special compass fluid as well as for an expansion chamber.

Two phenolic formulations for three parts

Figure 3 shows the component parts of this compass. The inner and outer bowls and the top ring are produced by the Bay State Moulding Co., 1189 Dorchester Ave., Dorchester, Mass. These three parts are compression molded in single-cavity, semi-automatic molds at a pressure of 2500 p.s.i. on a 7-in. ram press. The inner bowl is molded from either Bakelite BM 029 or Resinox 9424, both of which are special formulations developed to prevent discoloration of the liquid in the compass. This liquid, a petroleum-derived hydrocarbon, was recently developed by the Navy and would be affected by ordinary materials.

The outer bowl and top ring, which are never in contact with the compass liquid, are molded from a standard woodflour-filled phenolic material. In the case of these parts, the molder makes use of both Bakelite BM 120 and Resinox 6570. Brass inserts are molded into both of these parts—in the outer shell at right angles to the molding pressure.

Three different vinyls for four parts

Three formulations of Vinylite are used in a very novel manner in this compass. In one case a plasticized vinyl disk, measuring 0.008 in. in thickness and $3^{7}/_{16}$ in. in diameter, is placed in the outer bowl with its periphery resting on a shoulder molded on the inner lower surface of the bowl (Fig. 4). A vinyl O ring gasket, extruded by New England Tape Co., 30 Tower St., Hudson, Mass., rests on the surface of this vinyl disk (Fig. 4). This assembly, when locked into position by the lower portion of the inner bowl, provides an oil-tight seal, thereby allowing the vinyl disk to become the bottom of the oil chamber. (*Please turn to next page*)

1—Plastics, properly selected and used, made possible several new design features in this marine compass. Vinyl, phenolic and acrylic are the materials involved

* Reg. U. S. Patent Office

2

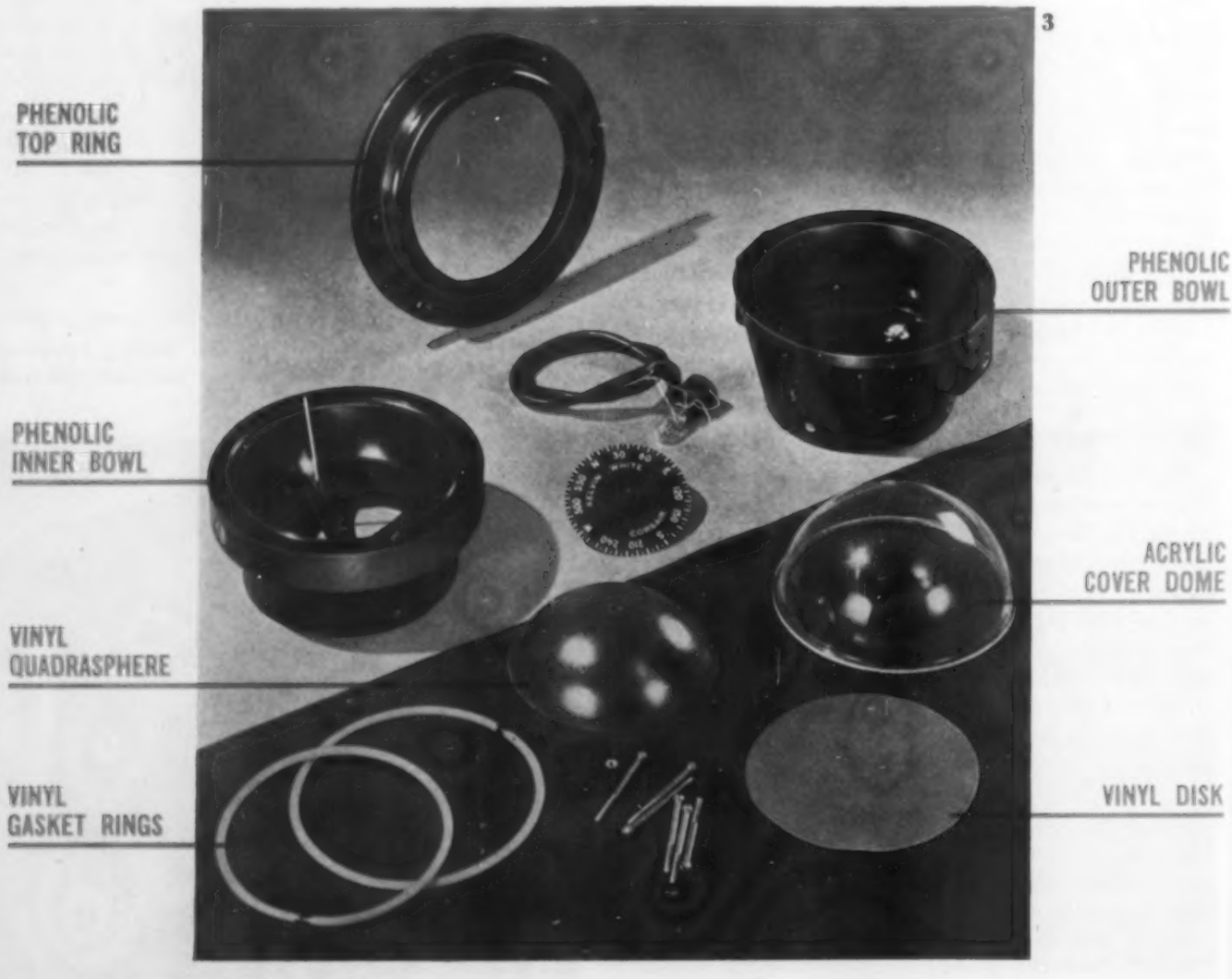
2—Two phenolic formulations are used in this compass. Top ring and outer bowl (shown above) are made of woodflour-filled phenolic. Inner bowl, however, needed a special compound because of contact with compass fluid

This vinyl disk has a dual function. Not only is it the bottom of the oil chamber but, due to its flexibility, it operates as an expansion member to the chamber. This development is a distinct advance in compass design and assures bubble-free long life at any temperature to which the compass may be normally subjected.

Vinyl is also used in the bottom of the molded phenolic inner shell. After the inner shell is placed in position on top of the vinyl O ring gasket used with the outer phenolic shell, a specially formed quadrasphere of 0.004-in. vinyl material is placed inside this inner shell so that it rests on supporting ribs which are molded on the lower inside portion of this phenolic piece (Fig. 5). Two small holes in the quadrasphere permit the oil to pass slowly from the upper to the lower part of the oil chamber, thus eliminating any surging action. The quadrasphere is made by a process of the Kelvin and Wilfrid O. White Co. A second vinyl O ring gasket, produced by the company making the outer shell gasket, is then placed in a circular recess which is molded in the top surface of the inner shell (Fig. 5).

The single acrylic part

A hemisphere of Plexiglas, which is formed by a special process of the compass manufacturer, is placed



3

4

5

4—In outer compass bowl assembly, vinyl resin serves two purposes. In sheet form it acts as bottom of the oil chamber. As gasket it forms an oil-tight seal. 5—In the inner bowl assembly a vinyl gasket again provides an oil-tight seal. Vinyl is also used because of its flexibility as the bottom of this bowl

directly on top of the vinyl gasket used with the inner phenolic shell. A phenolic ring in turn is placed in position on top of a shoulder that is produced on the rim of the acrylic hemisphere when formed.

Eight small threaded bolts, engaging with the inserts molded into the top ring, tightly lock all of these plastic components into position, completing the spherical internal chamber of the compass. Tapped side holes permit the compass to be filled with its special fluid. A threaded metal plug in each of these holes firmly seals the oil chamber.

Compass design

The compass itself (Fig. 1) is a "3½-in. spherical" and is patterned after the larger compasses produced by this company. The inner shape is that of a true sphere. Because of this design the company has not found it necessary to include a gimballed action for power-boat installations since the spherical nature of the bowl alone permits operating freedom up to an angle of 40°. However, since a great many small sail boats can heel considerably more than 40° the company does furnish a special gimball mounting which permits maximum performance on sail boats.

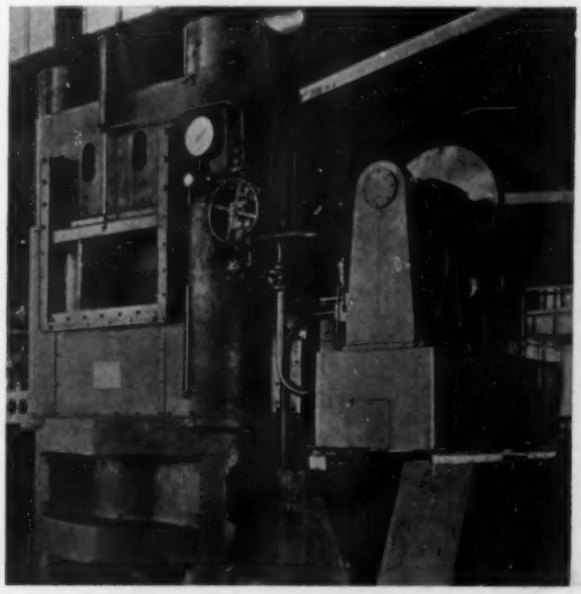
The 3½-in. compass card is designed with 5° indicating markers. This departure from the 1° card was made because it was established during the war that on small compasses the 5° card gave maximum visibility and readability. It was also found to be easy on the helmsman's eyes during a long trick at the wheel and was discovered to give just as accurate a course as did the 1° card.

The pivot is produced of platinum alloy for maximum resistance and wear under conditions of vibration. The jewel mounting for the compass card is a synthetic sapphire, and the balanced opposing magnet system in the bottom of the compass, acting as a built-in, adjustable corrector, must, of course, be metallic.

With the exception of the magnet, several nuts and bolts, and inserts, the entire compass is produced from the plastics materials, specified according to the function of each particular part of the compass.

MANUFACTURERS OF LARGE PLASTIC items such as radio cabinets, large escutcheons, instrument housings and containers have long felt the need of larger presses for hobbing cavities for plastic molds or die casting molds. For just such purposes, Elmes Engineering Works, a division of American Steel Foundries, 225 N. Morgan St., Chicago 7, Ill., has built an 8000-ton press which is capable of hobbing cavities from hobs having areas of up to 80 square inches. Made specially for the Midland Die & Engraving Co., 1800 W. Berenice Ave., Chicago 13, Ill., this 8000-ton press is now set up and ready for operation.

Its over-all weight is approximately 180,000 lb. and its height is 15½ feet. The 39½-in. diameter ram travels through a maximum stroke of 18 in. at a rate of 6 in. per min. under load and 11 in. per min. unloaded.



The Remarkable New Connsonata E

Beautiful ***PLASKON MOLDED C***

at Electronic Organ has
ED COLOR KEYS

The Connsonata Organ Keys are Molded for C. G. Conn. Ltd., Elkhart, Ind., by General Electric Company, Ft. Wayne, Ind.

Electronics now has invaded the music world in the form of the new Connsonata for church, chapel, home and auditorium. This revolutionary electronic organ matches the more typical voices of the great pipe organ, and duplicates with remarkable fidelity the tone of many symphonic instruments . . . *all without the aid of reeds, pipes, blowers, wheels or any other moving mechanical parts!*

The beautiful console styling of the Connsonata is enhanced by rich, gleaming Plaskon Molded Color keys. Here the warm, responsive feel and the dignified appearance of Plaskon Molded Color are given full expression. The color of the keys is permanent—it will not yellow or dull with age. The non-porous surface will not check or crack, does not soil easily, and can be kept clean with little effort. The smooth, lustrous polish tends to improve with handling.

This is another example of the versatility of Plaskon plastics, and their ability to exactly meet specific needs. Plaskon molding materials have many distinctive advantages that give them widespread application in the electrical, household appliance, cosmetic, drug, garment and many other fields. We shall be glad to help you adapt versatile Plaskon materials to your manufacturing and merchandising needs. Write for free illustrated book showing many applications of Plaskon* products.

* Reg. U. S. Pat. Off.

PLASKON DIVISION • LIBBEY • OWENS • FORD GLASS CO.
2121 SYLVAN AVENUE, TOLEDO 6, OHIO
In Canada: Canadian Industries, Ltd., Montreal, P. Q.

PLASKON
TRADE MARK REGISTERED
MOLDED COLOR

Cast prototypes solve design problems

1

2

1—Prototypes, like this brush holder and soap dish, can be cast in phenolic molds for customer approval without incurring high tool costs. 2—Models of radar parts are often cast in phenolic molds

Four outlets for fast curing phenolics

by L. R. MILLER*

CENTRIFUGAL casting of fast curing phenol-formaldehyde resins with relatively cheap dies is making possible many new plastics applications not feasible with standard casting techniques and the usual slower curing cast resins. The new resins, which cure in 5 to 15 min., provide a hard, durable material suitable not only for consumer products but for production molds.

This opens the door to four important services: 1) the production of prototypes and sales samples of a proposed molded plastic part without the expense of steel dies or fabrication; 2) the filling of short-run product orders economically with low-cost cast molds; 3) the casting of industrial tools, such as form dies for acrylics or duplicating patterns for plastic and die cast molds; and 4) the production of parts too large or thick for practical molding.

Prototypes solve design problems

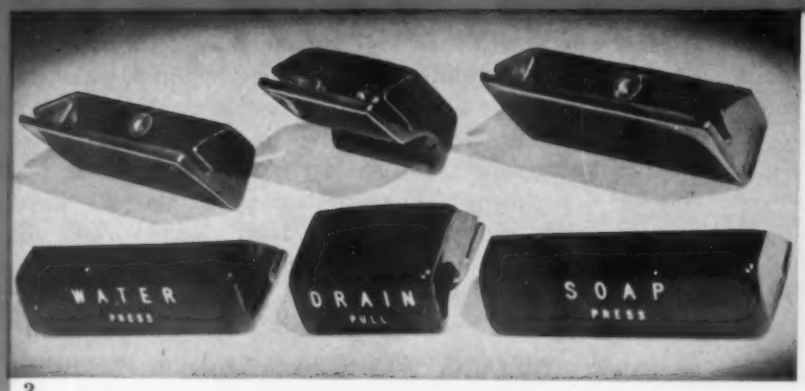
The first phase of specialized service with fast curing resins is in filling needs for immediate, economical prototypes of a part intended for plastic molding. Through this process it is possible to secure an exact prototype of the molded part, with the desired colors and surface finish. This can be used to work out engineering details of molding and die design and also to test the consumer market before going into the high cost of steel dies for production.

An example of the merits of this procedure can be seen in the development of a bathroom accessory. The initial plan was to produce two separate units; a soap dish and a toothbrush holder. Parts were developed from the clay models furnished by the customer. These models were sent to the plaster pattern department where they were reproduced in plaster and made dimensionally true. After incorporating several changes, desired by the customer, the phenolic molds were quickly cast from the plaster forms.

Six samples were cast from the phenolic molds and were used to secure buyer reactions before setting-up production by injection molding. The survey proved that the parts were too large and would not live up to sales expectations. The parts were immediately redesigned, combining both units into one, and then reproduced in the same manner as above (Fig. 1). Orders placed on this unit justified the fabrication of steel dies for production in polystyrene. With the help of cast plastics, this entire design and market research problem was solved in only 30 days. Cost of steel dies for the original rejected design was avoided. Prototype of the new design enabled customers to estimate material weight of molded part and plan molding procedure. Phenolic molds from which accepted prototype was cast were used as duplicating patterns for machining final

* Chief engineer of the Renolin Co., 121 South Robertson Blvd., Beverly Hills, Calif.

Fast curing resins cut short run costs



3

4

3—Quick-setting resins cast in phenolic molds prove economical for short run production on items like airplane sink controls. 4—Fast-curing resins also cut cost of displays, usually short run items

mold in steel. Thus, the cost of phenolic molds was considerably reduced.

Cast phenolics for short run orders

The second, but equally important, phase of service to industry is the production of short-run orders, which has always been a problem. This production involves from one part to 3000 parts or a schedule calling for a limited number per month over a long period of time. In most cases where plastics have been considered for this limited production, consumers were faced with either prohibitive steel die costs for molding or an impracticable fabrication problem. Consequently they have used metal sand castings and other materials to fill their needs.

This problem is especially acute in the aircraft industry where today production is often less than 100 planes. A typical example is the three aircraft parts (Fig. 3) required for the Douglas DC-6 lavatory sink. Scheduling called for 300 parts each. Metals were undesirable; plastics were light weight and could give desired color and surface finish. Obviously this limited production did not justify the cost of approximately $1500 each for steel dies. This problem was solved by the use of fast curing phenolic resins and inexpensive phenolic molds. Starting from blueprints, phenolic molds were completed at a cost of only $245 each, and total production of all three parts was delivered within one month. Also, upon request of the customer, a process was developed for producing white flush lettering. This lettering, cast into the part, cannot fill in with dirt or be obliterated by even the harshest cleaning solvents.

Ultra-violet lamp housings called for a production of 2000 each per year. These parts were found to be impractical for fabrication and were presented to companies for compression molding. Here again the limited quantity and the problems of molding a one-piece unit did not justify the high steel die cost, which was approximately $4000 each. These housings were ultimately produced in cast phenolic at an average cost per mold of $300. The problem of casting a one-piece housing which would eliminate the leakage of high voltage current was accomplished by withdrawing undercut core sections while the cast phenolic was in the slightly rubbery state. Polymerization was then completed through further curing in the oven. These

PHOTOS, COURTESY REZOLIN CO.

Cast tools are cheap

5—Fast-curing resins give smooth surface to die which turns out airplane nose section

Accuracy in patterns

6—Phenolic patterns of insecticide spray housing save time in machining steel dies

7—A precise cast plastic pattern set on a duplicator machine is reproduced on steel

housings have proved themselves through rough treatment by miners who use the ultra-violet lamp for detection of minerals.

Casting large and thick parts

Another problem is the production of parts too large or thick to be practical for molding. A typical case, shown in Fig. 4, called for production of just four parts. It was first planned that these display sign parts would be made in wood and painted. This, however, could not be done in the time allotted before the opening of an exposition which was to display the company's products. By using cast phenolic the schedule was met and a saving of 60 percent in cost was made over the estimate of fabricating these parts in wood.

A local furniture manufacturer was having trouble with carved wooden arms and legs for an over-stuffed bed divan set. These wooden pieces not only showed the roughness of carving but came out in uneven colors upon painting. To complete the set in plastic moldings, seven different molds were required, which would have made the cost of compression molding prohibitive. These problems were solved in cast plastics by turning an existing set of wood moldings over to the plaster department for reproduction in plaster. Phenolic molds were quickly cast from the reworked plaster models, and 1000 sets (12,000 parts) of moldings were completed within 45 days. Thus, in working out a problem of short-run plastic production for industry, fast curing phenolic resins are making possible many new plastic applications, and some successful developments are later turned out in large quantity production by compression and injection molders.

Cast plastics for industrial tooling

The final phase of the cast plastics field is the production of industrial tooling. Phenolic tooling was developed during the war years as a temporary measure in expediting design changes in the aircraft industry. Because of the time saved in fabrication and the simplicity of producing dimensionally correct tooling, this tooling has become standard for many applications.

Figure 5 demonstrates tooling used for forming the smooth nose section of an aircraft in acrylic. The contour of the phenolic die is produced by simply casting over the existing plaster pattern. A small amount of sanding and buffing is required to produce the highly polished surface necessary to reproduce an optically perfect part, a "must" in such aircraft work. The use of cast phenolics for acrylic form dies has not only proved a saving in time over previously used metals but the insulating properties of the phenolic prevents the acrylic from "setting" before final contours can be secured.

Cast plastics again offer a direct service to molders by providing cast phenolic duplicating patterns. These patterns, cast to exact contours, are used on a duplicating machine for reproducing in steel the compression or injection molding die. This process of duplicating has reduced the time of securing compound contours in steel dies as much as 40 percent. A typical example is the insecticide housing patterns shown in Fig. 6. These patterns were produced from prints. First a plaster mockup of the part was made. Overstock and parting lines were then established and plaster negatives reproduced. Cast phenolic duplicates of the ultimate steel mold were then cast from the plaster negatives. This work was completed in 15 days. Unlike materials formerly used such as wood and plaster, these cast phenolic patterns have a hard surface which resists "grooving" and "chipping" (Fig. 7).

Other applications of cast phenolics in tooling are foundry patterns, stretch form dies for aluminum, assembly jigs for sheet metal parts, hydro-press dies, nest blocks and wind tunnel models. Light weight, ease of handling, good dimensional stability and low cost make phenolic tools desirable in any tooling program.

The industrial molding material, MELMAC 1502, makes it possible for the famous RCA television camera tube—RCA-2P23—to provide better performance.

MELMAC 1502 used in the projection, picture-reproduction tube—RCA-5TP4 — as shown above, helps to provide the superior performance for which RCA tubes are well known.

NEW AND NEWS!

Improved MELMAC* Plastic Gives Television Better Eyes . . . The Audience A Better Show

New Material May Have Better Characteristics For Your Product, Too

After much research and testing, the Radio Corporation of America now is able to give its high voltage television tubes even better electrical characteristics and better performance through the use of a new, cellulose-filled industrial melamine compound—MELMAC Plastic 1502, produced by American Cyanamid Company.

MELMAC Plastic 1502 has extraordinarily good electrical and physical qualities, as shown by some of the data listed below. It possesses the arc resistance that cuts to a minimum the surface leakage to which the bases of high voltage television tubes are constantly subjected—leakages that interfere with reception and might shorten tube life. And, in addition, MELMAC 1502 offers the extra strength and fine dimensional stability necessary for accurate, long, and economical performance.

The moldability of this new MELMAC plastic is excellent either by transfer or compression methods and the material also molds well around metal inserts. We shall be glad to work with *you* on MELMAC's dielectric applications. American Cyanamid Company, Plastics Division, 32 Rockefeller Plaza, New York 20, New York.

SOME TECHNICAL FACTS ABOUT MELMAC* PLASTIC 1502

1. Shrinkage

Low shrinkage is a characteristic of this new plastic material.

Mold—.0066 (.006-.007) in./in.
After 8 hrs. at 220°F—.0002 (0-.001) in./in.
After 48 hrs. at 220°F—.0011 (.0005-.002)
Weight per Cubic Inch—23.4 gms.

2. Electrical Properties

Tests conducted according to ASTM Methods (0.125 in. Specimen).

Arc Resistance—(80-128) secs.
Track Resistance—Good.
Uniformity of Arc Resistance—Excellent.

3. Physical Properties

Tests conducted according to ASTM Methods.

Specific Gravity—1.43 gms/cc.
Water Absorption 24 hrs. at 25°C
%—0.28 (0.27-0.29).
Izod Impact—.40 (.38-.41) ft. lbs.
Flexural Strength—9500 (9000-10,000) lbs./sq. in.
Deflection—.050 (.048-.053) inches.

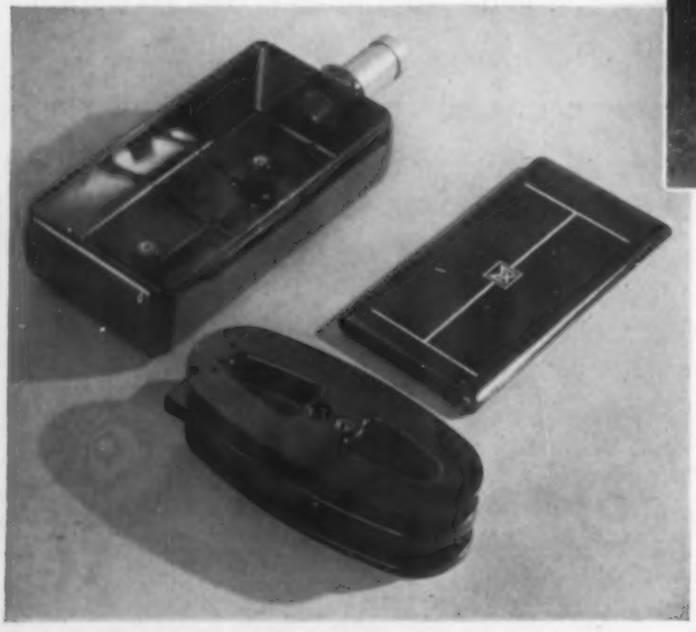
BEETLE* plastics—urea-formaldehyde thermosetting molding compounds. MELMAC* plastics—melamine-formaldehyde thermosetting molding compounds, industrial and laminating resins. URAC* resins—urea-formaldehyde thermosetting industrial resins and adhesives. MELURAC* resins—melamine-urea-formaldehyde thermosetting resin adhesives and laminating resins. LAMINAC* resins—thermosetting polyester resins. PHENAC* resins—phenol modified resorcinol thermosetting resin adhesives.
*Reg. U. S. Pat. Off.

Cyanamid Plastics

"Come Out..Come Out..Wherever You Are.."

This Tire Inspector is no hammer..yet it "hits a nail right on the head!"

Heart of the new Magnaflux Electronic Tire Inspector is the locating head. This device comprises a specially designed wire-wound bobbin and case. Both units are molded of a Durez plastic—formulated with the high-impact strength properties of Claremont Fillers. The instrument is used for spotting and pin-pointing metal particles imbedded in tire treads. It operates similarly to a mine detector. Prime reasons for specifying the use of a Claremont filled Durez plastic was due to excellent dielectric properties, self-insulation for the coil, and freedom from interference on the part of the plastic with the magnetic field which the coil generates. Were there such a device for detecting the strength giving qualities in the field's best known plastic materials, the indicator would in the majority of cases point to Claremont Fillers! . . . Available in four types (flock, thread, chopped fabric and cord), these plastic muscle builders are carefully graded, uniform in size, and processed to specific requirements. Samples for laboratory test runs available upon request. Inquiries invited!



Above: Tire Inspector Plastic Parts, as molded of Claremont filled Durez by Trans-Matic Plastics Co. for Magnaflux Corporation. Upper Right: After locating head registers the imbedded particles, a mallet shaped spotter is used to pin-point the crosswise location of the metal.

CLAREMONT

FLOCK
THREAD
FABRIC
CORD

THE FILLER IS THE HEART

CLAREMONT
WASTE MANUFACTURING CO.
"The Country's Largest Manufacturer of Flock" CLAREMONT, N. H.

Wood treatment with resin-forming systems

A study of size and species limitations

by M. A. MILLETT and ALFRED J. STAMM*

PREVIOUS papers in this series[1,2] have dealt with the treatment of thin cross sections of wood and of 1/16-in.-thick veneer, with which complete treatment of the fibers is simple to obtain. Most of the publicity on the treatment of wood with urea resin-forming systems has been concerned with the treatment of lumber.[3–5]. Experience has shown, however, that this treatment is practically impossible to accomplish on the heartwood of any species.

Surface treatments and even partial penetration treatments cause little if any change in heartwood properties and they introduce stress difficulties that promote internal checking. The treated zones swell more than the untreated zones during the treating process. Upon drying and curing, the treated zones shrink less than the untreated zones—resulting in damaging stresses. For these reasons, it did not seem worthwhile to make further tests on heartwood.

In order to gain more complete information on the limitations imposed by size and species on the resin

* Chemists, Forest Products Lab., Forest Service, U. S. Dept. of Agriculture, maintained in cooperation with University of Wis. at Madison 5, Wis.

[1] "Treatment of wood with urea resin-forming systems (dimensional stability)," by M. A. Millett, A. J. Stamm, MODERN PLASTICS 24, 150 (Oct. 1946).

[2] "Treatment of wood with urea resin-forming systems (comparison with phenolic resins for making compreg)," by M. A. Millett and A. J. Stamm, MODERN PLASTICS 24, 159 (Feb. 1947).

[3] J. F. T. Berliner, Southern Lumberman, 140 (Dec. 15, 1943).

[4] "Methylolureas advances resin impregnation of wood," by J. F. T. Berliner, Chem. Ind. 54, 680 (1944).

[5] H Manchester, Readers Digest 45, 43 44 (Aug. 1944).

Summary

Solid wood specimens measuring 2 by 2 in. by 4 ft. and 2 by 2 in. by 6 ft., taken from the sapwood of nine species of common commercial woods, were treated by the pressure-cylinder method with solutions of dimethylol and urea-formalin resins and of a water-soluble phenolic resin, all at a resin-forming-solids content of 20 percent. After two weeks of kiln drying to a moisture content of about 8 percent, the treated specimens were cured under contact pressure in a hot-plate press at 310° F. for 7 hours. Anti-shrink-efficiency measurements were then taken of 1/8-in. cross sections cut from each specimen at intervals of 6 to 12 in. along its length. Data on specific gravity and hardness increases due to resin treatment were also obtained at various positions from the ends and surfaces of the 6-ft. specimens.

The data indicated that reasonably uniform resin penetration is possible for the sapwood of such species as cottonwood, sweetgum, black tupelo, yellow poplar, yellow birch and maple in lengths up to 6 feet. In the 4-ft. lengths, urea resins showed one-fourth to one-half of the anti-shrink values of the phenolic resin, while in the 6-ft. lengths, these values were considerably lower—too low, in fact, to be of any practical value. The average hardness increase obtained in the 6-ft. specimens was about 20 percent.

In all cases, resin treatment of these solid wood specimens showed appreciably less improvement in hardness and moisture resistance than has been obtained from panels made from individually treated plies of veneer. Moreover, the treating, drying and curing of solid wood takes considerably more time than would be required for making the same size specimens from glued and treated veneer. The test results indicate that the treatment of larger solid wood specimens would not be practical from a commercial standpoint, even for the relatively easy treatment of sapwood.

Table I.—Longitudinal Resin Distribution in 4-Ft. Specimens of Eight Species, as Measured by Their Anti-shrink Efficiency

Species	*Resin*	*Gross resin content*	*Anti-shrink efficiency*[a]				
			Ends	*6 in. from ends*	*12 in. from ends*	*18 in. from ends*	*Center*
		%	%	%	%	%	%
Sugar maple	DMU[b]	15.5	5.0	10.0	10.5	10.0	11.0
	UF[c]	11.0	6.5	7.0	4.5	4.0	3.6
	PF[d]	11.1	47.5	41.5	35.5	37.0	31.5
Yellow birch	DMU	16.2	11.0	16.0	16.5	15.5	14.0
	UF	14.6	13.5	13.0	15.0	13.0	12.5
	PF	20.8	60.5	58.0	57.0	55.5	55.5
Sweet gum	DMU	16.2	29.5	30.5	30.0	30.0	30.0
	UF	15.6	27.0	25.0	26.0	26.0	25.0
	PF	25.3	62.0	61.5	61.5	62.0	62.0
Black tupelo	DMU	15.2	19.0	22.5	21.5	22.5	21.0
	UF	16.2	20.0	21.0	24.0	23.5	23.0
	PF	25.8	62.0	60.0	60.0	60.0	61.5
Yellow poplar	DMU	14.5	9.5	6.5	5.0	4.5	4.0
	UF	16.5	8.5	8.5	9.0	7.5	9.5
	PF	27.1	55.5	45.5	43.5	39.0	45.0
Cottonwood	DMU	17.0	20.0	21.5	22.0	22.0	23.0
	UF	16.3	19.0	22.0	23.0	22.0	20.0
	PF	25.6	69.5	66.5	67.0	67.0	67.5
Douglas fir	DMU	10.5	18.5	25.0	29.0	33.0	31.0
	UF	7.2	14.5	14.5	22.0	21.5	22.5
	PF	12.5	48.5	38.5	32.0	36.0	40.0
Ponderosa pine	DMU	30.2	15.0	20.5	34.0	26.5	27.0
	UF	28.5	14.0	27.0	31.5	27.0	27.5
	PF	22.5	66.0	56.5	53.5	47.0	45.0

[a] Values are average for two treated specimens of each species.
[b] Dimethylol-urea resin.
[c] Urea-formalin resin.
[d] Water-soluble phenolic resin.

impregnation of solid wood, a study was made on the sapwood of nine species in 4- and 6-ft. lengths. Both urea-formaldehyde and phenol-formaldehyde resins were used under treating conditions so chosen as to represent practical commercial practice.

In the preparation of specimens for treatment, freshly cut logs and stock lumber were cut into lengths measuring $2^3/_4$ by $2^3/_4$ in. by 8 ft. and kiln dried to between 8 and 10 percent moisture content. The dried material was then recut and planed to provide test specimens measuring 2 by 2 in. by 7 ft. with the plane of the annual rings as nearly parallel to two opposite faces as possible. Approximately 10 such specimens were provided for each of nine species, including sugar maple, yellow birch, cottonwood, yellow poplar, black tupelo, sweetgum, ponderosa pine, Douglas fir and Sitka spruce. Previous comparative tests had shown that 30-in. lengths of the sapwood of basswood and aspen could be treated quite completely with both types of resin used.

Both commercial dimethylol urea and crystal urea and formalin solution were obtained fresh from the same manufacturer. The water-soluble phenolic resin used for comparative tests was one of the standard resins for this purpose.[6]

As a visual aid in determining the extent of resin penetration, 0.05 percent of a water-soluble red dye was added to the treating solution. Ultraviolet fluorescence studies which were made on the partially treated veneer showed that the dye quite closely followed the resin penetration.

Treatment of 4-ft. specimens

Six specimens of each species, matched as well as possible, were selected for treatment. Each specimen was cut into the following pieces: one 4-ft. length for treatment, three 1-ft. lengths to be used as untreated controls for the swelling data. For each species, two specimens were treated with dimethylol urea (DMU), two with a urea formalin mix (UF) and two with the water-soluble phenolic resin (PF). All solutions were proportioned to provide up to a 20 percent resin-forming solids content, with the urea resins buffered at a pH of 8 and having a 2:1 formaldehyde to urea ratio as was reported most suitable in a previous publication.[1]

Treatment was applied by the pressure-cylinder method, in which an air pressure of 200 p.s.i. was used for 5 hr. at room temperature. Following this treatment, the specimens were stored under non-drying conditions for 48 hr. to permit diffusion of the resin through the wood. After this period each specimen was end-coated, stickered in a dry kiln and dried to a moisture content of about 6 to 8 percent using a mild drying schedule.

This kiln schedule started at 140°F. and 85 percent relative humidity, and at the end of 10 days had reduced the moisture content to 30 percent, after which 160°F. and 50 percent relative humidity were used for four days. Curing of the resin-impregnated specimens was done in a hot-plate press under contact-pressure conditions with the platens at 310° F. A period of $6^1/_2$ hr. was required for the center of the specimens to reach 290° F. This temperature was maintained for an additional 30 min. to allow for resin cure.

In order to determine the extent and thoroughness of resin distribution, each treated and cured specimen was cut into 6-in. lengths, from each of which were cut two $^1/_8$-in. cross sections for swelling tests. Similar cross sections were cut from the untreated controls. After all edges of the cross sections were sanded to remove loose fibers, the sections were oven-dried for 24 hr. at 105° C., measured radially and tangentially with a dial gage, and then immersed in water for 48 hr. to allow them to reach equilibrium swelling conditions. Entrapped air was removed after immersion by placing the specimens in a desiccator and subjecting them to a vacuum for about 30 minutes. The water-swollen specimens were again measured, and the percentage of swelling was calculated for both the treated and the control specimens.

The difference between the swelling of the control specimens and that of the treated specimens, divided by the swelling of the control specimens and multiplied by 100, gave what has been termed the anti-shrink efficiency (A.S.E.). Table I presents a summary of the data obtained on longitudinal resin distribution

[6] "Comparison of commercial water-soluble phenol-formaldehyde resinoids for wood impregnation," by H. K. Burr and A. J. Stamm, FPL Report No. 1384, Revised 1945, p. 20.

in the 4-ft. specimens as measured by the anti-shrink efficiency. The values given are averages of the two treated specimens of each species.

Table I shows treatment of 2-by 2-in. by 4-ft. specimens of sweetgum, black tupelo, cottonwood, yellow poplar and yellow birch was uniform throughout the test pieces. Sugar maple, Douglas fir and ponderosa pine showed only a slight falling off of resin content toward the center of the specimens, but these species would probably give satisfactory results if they were given a somewhat longer treating time.

The urea resins showed only 1/4 to 1/2 the reduction in swelling and shrinking that had been obtainable with the water-soluble phenolic resins. This difference is greater than the difference obtained on thin cross sections where treatment was complete.[1] It can be accounted for in part on the basis of the smaller take-up of the urea than of the phenolic resin-forming materials.

Treatment of 6-ft. specimens

In view of the more or less uniform results from treatment of the 4-ft. specimens, it was decided to treat longer specimens of the same species in an attempt to learn whether additional length would limit resin penetration in material of the same cross section. Because the test specimens, as prepared from the logs, were only 7 ft. in length, the maximum specimen length for this new treatment was limited to 6 feet. The remaining 12-in. lengths were used as controls. Owing to lack of sufficient material on hand in some species, only one specimen of each species was treated, and only the urea-formalin mix and phenolic resin were studied.

Treating, drying and curing procedures were similar to those used with the 4-ft. specimens. In addition to anti-shrink-efficiency measurements for determining the resin penetration, specific gravity and standard ball-hardness data were obtained at various positions from the ends and from surfaces of the 6-ft. sections.

While the three different methods of determining the resin penetration in the 6-ft. lengths gave conflicting results for some of the species, the following general conclusions may be reached from a study of Table II:

1. The sapwood of sweetgum, yellow poplar, yellow birch, cottonwood and sugar maple can be treated in 6-ft. lengths with a water-soluble phenolic resin to give reasonable uniformity in anti-shrink-efficiency values. These are not so high as those obtained with veneer.[6–8]

2. The anti-shrink values obtained with the urea resin were considerably lower than those obtained on the 4-ft. lengths and were too low to be of any practical value for stabilization purposes. The negative values obtained for the yellow birch and yellow poplar specimens seemed to indicate that the resin was not fully cured and that the uncured resin constituents caused swelling beyond water-swollen dimensions. The ponderosa pine sample checked so badly during drying that swelling cross sections were not obtained.

3. Yellow birch showed a maximum increase in hardness, due to resin treatment of about 60 percent. However, the over-all average for all eight species was only 20 to 25 percent. In general, the increase in hardness paralleled specific gravity increase.

4. In no case was the increase in hardness sufficient to warrant resin treatment for this purpose.

5. The penetration values shown by the anti-shrink-efficiency and hardness increases in the phenolic-resin-treated specimens were sufficiently higher than the corresponding penetration values shown for the urea resin to more than make up for higher cost of phenolic resin.

[7] "F P L resin-treated plywood," by A. J. Stamm and R. M. Seborg, Ind. Eng. Chem. *31*, 897 (1939).

[8] "F P L resin-treated wood (Impreg)," by A. J. Stamm and R. M. Seborg, F P L Report No. 1380, p. 9, Revised 1943.

Table II.—Longitudinal Resin Distribution in 6-Ft. Specimens of Eight Species, as Measured by Their Anti-shrink Efficiency, Specific Gravity and Standard Ball Hardness[a]

Species	*Type of resin*	*Gross resin content*	*Anti-shrink efficiency*				*Specific gravity increase*				*Hardness increase*			
			Ends	*12 in. from ends*	*24 in. from ends*	*Center*	*Surface of end section*	*Center of end section*	*Surface of center section*	*Center of center section*	*Surface of end section*	*Center of end section*	*Surface of center section*	*Center of center section*
			%	%	%	%	%	%	%	%	%	%	%	%
Sugar maple	Urea	10.6	9.0	6.5	7.5	6.5	9.0	6.5	12.0	5.5	24.0	5.5	17.0	16.0
	Phenolic	15.7	53.0	41.0	37.0	42.0	7.0	4.0	7.5	1.0	30.5	19.0	20.0	12.0
Yellow birch	Urea	15.8	−11.0	−4.0	0.0	−1.5	15.5	13.0	17.0	13.0	39.0	26.5	48.0	33.5
	Phenolic	23.8	59.5	45.5	42.0	51.0	16.0	8.0	15.0	6.5	62.0	27.5	44.5	8.0
Sweetgum	Urea	15.3	14.5	5.5	4.0	7.0	17.5	1.0	19.5	5.5	21.0	14.0	10.0	3.0
	Phenolic	23.2	70.0	64.0	63.5	64.0	6.5	4.0	7.0	2.5	2.0	11.5	8.5	4.0
Yellow poplar	Urea	13.8	−11.0	0.0	4.5	0.0	21.0	8.0	20.5	0.0	21.0	19.0	27.5	12.5
	Phenolic	30.8	61.0	52.0	51.5	52.0	25.5	28.0	23.5	28.0	49.5	49.5	15.5	14.5
Cottonwood	Urea	18.6	1.0	2.0	2.0	1.0	27.0	13.0	26.5	10.0	32.0	5.0	18.0	0.0
	Phenolic	31.5	63.5	59.0	57.5	57.5	18.0	24.5	20.0	12.5	30.0	46.0	38.5	21.0
Douglas fir	Urea	7.4	10.5	13.0	13.0	15.0	5.0	3.5	5.5	5.0	9.0	3.0	1.5	1.5
	Phenolic	11.0	50.5	13.5	15.0	21.0	9.0	4.0	4.0	2.5	7.5	3.5	1.0	0.0
Ponderosa pine	Urea	22.0	..	..	..	..	..	..	..	..	..	..	..	..
	Phenolic	26.6	57.0	45.5	39.5	37.5	26.5	9.5	20.5	0.0	39.5	6.0	17.5	0.0
Sitka spruce	Urea	11.5	12.5	16.5	22.5	23.0	14.5	3.0	9.0	2.5	11.5	0.0	3.0	0.0
	Phenolic	19.5	65.0	33.0	32.5	31.0	13.5	14.5	9.5	7.0	14.5	30.5	16.5	23.0

[a] Values are for one specimen of each species.

Acrylate polymers in Germany (Part II)*

THE PRODUCTION of acrylic polymers (Acronals) was carried on in Germany by I. G. Farbenindustrie A. G. at Ludwigshafen. The compositions, tonnages produced in 1942 and cost per kilogram of the monomers and polymers are shown in Tables II and III. The peak wartime output of polyacrylate emulsions (25 to 50 percent solids) was 500 to 600 short tons per month. Highest production of polyacrylate solutions (20 to 50 percent solids) was 125 tons per month. Peak output of polyacrylate solids was 8 to 10 tons per month.

Emulsion polymers

The properties and applications of the I. G. acrylate emulsion polymers are presented in Table I.

These aqueous polyacrylate dispersions, which are identified by the letter D following the number designation, have the advantage of low viscosity as compared with the solutions of analogous polymers in spite of their high concentration. They can therefore be applied as thick coatings or impregnations in one operation. The absence of solvents is another advantage. Recovery of solvents and special fire precautions and ventilation of the shop are avoided.

A noteworthy feature in the preparation of those dispersions to be used in pigmented finishes is the introduction of 1 to 2 percent of acrylic acid in the charge to the reaction kettle. The resultant copolymer dispersion can be thickened by neutralization with ammonia and will take much larger quantities of pigment. In fact, pigmented lacquers containing only 25 percent vehicle can be made in this way which equal in viscosity those containing 50 percent vehicle without this treatment.

Polymethyl and polyethyl acrylate dispersions found extensive use in textile sizings, artificial leather and can lacquers. A stabilizer known as Emulphor O was sometimes added to the extent of 1 to 2 percent; this compound was made from 20 mols ethylene oxide and 1 mol C_{15}-C_{17} Fischer-Tropsch fatty alcohols.

A wide variety of acrylate copolymers was manufactured by emulsion polymerization in accordance with the compositions shown in Table III. These were produced in varying degrees of toughness from 200 D (toughest) to 600 D (most flexible). Polymethyl acrylate lies between 400 D and 450 D in film hardness; polyethyl acrylate is similar to 500 D; and polybutyl acrylate is softer than 600 D.

One of the largest outlets for the acrylic resin emulsion copolymers was in shoes. One firm made 200 tons monthly of shoe counters by mixing two parts of shredded leather scrap with one part Acronal 400 D, drying on a belt drier and pressing the mass into sheets between platens heated to 150° C., Other leather

* "Investigation of German plastics. Part I," by G. M. Kline, J. H. Rooney J. W. C. Crawford, T. Love, and F. J. Curtis, PB 949. See also "Acrylate polymers in Germany," MODERN PLASTICS, 24, 147 (Aug. 1947).

Table I.—Properties and Applications of I. G. Acrylate Resins

			Properties of the dispersions				*Properties of the films*[b]						*Applications*	
													Artificial leather products	
Acronal type	*Concentration*	*Acidity*	*Viscosity*[a] *(DIN 53211 at 20° C.)*	*Particle size (average radius)*	*Compatibility with pigments*	*Resistance to freezing temperatures*	*Specific gravity*	*Surface tackiness*	*Elongation (approx.)*	*Tensile strength (approx.)*	*Resistance to cold*	*Resistance to oil and benzine*	*With leather, paper, textile fibers*	*With paper, textile sheets*
	%	*pH*	*sec*	*micron*					%	*kg./cm.²*	*° C.*			
I D	25	8–9	12–14	0.13	No	No	...	...	...	...	...	...	...	...
I D	40	5–6	12–14	0.13	No	No	1.26	Very slight	900	60–70	+10 to +12	Yes	...	...
II D	25	6–7	13–14	0.11	No	No	...	...	...	...	...	...	Mid, inner soles; soles for shoes, slippers; welts	Case and bag leather; bookbindings, etc.
II D	40	4–5	14–15	0.13	No	No	1.164	Tacky	2000	2.5	−13 to −15	Yes		
II D (Copolymer with acrylic acid)	40	3.5–4.5	13–15	0.1–0.3	Yes	No	1.185	Tacky	2500	10	− 5 to −10	Yes		
IV D	25	5–6	13–15	0.08	No	No	...	...	...	...	...	...	...	
IV D	40	5–6	14–16	0.06	No	No	1.14	Very tacky	>2500	0	ca. −30	No	...	...
200 D	50	5–6.5	50–70	0.25	Yes	Limited	...	None	200	100	ca. +20	Yes	...	...
250 D	40	7–8	13–15	0.1	Yes	Limited	...	None	300	210	ca. +20	Yes	...	...
300 D	50	4.5–5.5	12.5–16	0.16	No	No	1.214	None	500	160	+ 8 to +14	Yes	...	...
400 D	40	7.5–9	12.5–14	0.15	Yes	No	1.205	Very tacky	800	120	+15 to +17	Yes	Mid, inner soles; soles for shoes, slippers, counters, welts; back stays	Same as above; hat bands, etc.
450 D	40	8–9	12.5–14	0.15	Yes	No	1.095	Tacky	2500	5	0 to − 5	Yes		
500 D	50	4–5.5	14–18	0.1–0.14	Yes	No	1.12	Tacky	1700	15–25	− 5 to −10	Yes		
550 D	50	5–6.5	17–21	0.19	Yes	No	1.105	Very tacky	2500	2.5	+ 5 to + 8	Some		
600 D	40	5–6	12–14	0.05	No	No	1.132	Very tacky	>2500	0	−15 to −20	Some		

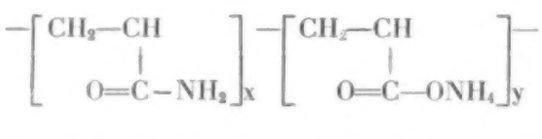
[a] DIN = German specification.
[b] Films 0.5 mm. thick were dried at about 60° C. and tested at 20° C.

Table II.—Types of Acrylic Monomers Produced at Ludwigshafen

Acronal type	*Composition*	*1942 Production*	*Cost*
		tons	*RM/kg.*
...	Acrylic acid	570	1.41
...	Acrylonitrile	1014	1.77
...	Methyl acrylate	844	1.50
...	Ethyl acrylate	2004	1.75
...	Butyl acrylate	763	1.89
...	Methyl methacrylate	27	2.43

substitutes were made by impregnating absorbent paper fibers or a cheap felt made of lint, rayon fluff and cotton waste.

The Latekolls were sold to the textile and carpet industries as stiffeners and to the lacquer and paper industries as binders. A related product, but one compatible with a greater variety of products than the Latekolls, is Collacral N. This is composed of 75 percent acrylonitrile and 25 percent methyl acrylate on the weight basis. The dispersion is saponified by ammonia:



This material approximates casein closely in properties and is a very good thick- (*Please turn to page 212*)

Table I.—I. G. Acrylate Resins (continued)

Applications (continued)		
Coating materials	*Containers; papers resistant to oil, water*	*Adhesives; textile finishes*
...	Yes	Adhesives
...	Yes	Adhesives
...	...	...
...	...	...
Artificial leather; oilcloth; bookbindings; window shades		Adhesives; textile sizing
...	...	Adhesives
...	...	Adhesives
...	Yes	...
Glossy, water repellent finish	Wash wall, and other papers	...
Glossy finish	Yes	Adhesives; also in admixtures with water-soluble colloids, latex, Igetex, (synthetic rubber latex), Igevin J60D (polyvinyl isobutyl ether) as fabric and film finishes
...	...	
Artificial leather; oilcloth;	...	
Heel liners	...	
Book bindings	...	
Window shades	...	

Table III.—Acrylic Polymers Produced at Ludwigshafen

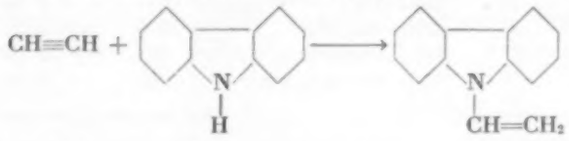
Acronal type	*Composition*		*1942 output*	*Cost*
			tons	*RM/kg.*
	EMULSION POLYMERS			
I D	Polymethyl acrylate			
	25% conc.		147	0.48
	40% conc.		184	0.76
II D	Polyethyl acrylate			
	25% conc.		423	0.55
	40% conc.		922	0.86
IV D	Polybutyl acrylate			
	25% conc.		9	0.59
	40% conc.		10	0.94
200 D, (50%)	Methyl acrylate	15	...	...
	Vinyl isobutyl ether	50	...	...
	Acrylonitrile	35	...	...
250 D, (40%)	Methyl acrylate	80	174	0.74
	Vinyl benzoate	20	...	...
	Acrylic acid	1	...	...
300 D, (50%)	Butyl acrylate	1	23	0.68
	Vinyl acetate	1	...	...
	Vinyl chloride	1	...	...
400 D, (40%)	Methyl acrylate	66	530	0.68
	Vinyl isobutyl ether	20	...	...
	Styrene	12	...	...
	Acrylic acid	2	...	...
430 D, (50%)	Methyl acrylate	30	...	...
	Vinyl isobutyl ether	50	...	...
	Acrylonitrile	20	...	...
450 D, (40%)	Ethyl acrylate	66	2961	0.75
	Vinyl isobutyl ether	20	...	...
	Styrene	12	...	...
	Acrylic acid	2	...	...
500 D, (50%)	Butyl acrylate	49	2360	0.89
	Vinyl acetate	49	...	...
	Acrylic acid	2	...	...
550 D, (50%)	Methyl acrylate	27	719	0.75
	Vinyl isobutyl ether	27	...	...
	Acrylic acid	1	...	...
600 D, (40%)	Ethyl acrylate	76	169	0.78
	Vinyl isobutyl ether	22	...	...
	Acrylic acid	2	...	...
Latekoll S, (30%)	Polyacrylic acid		3	0.58
Latekoll N, (25%)	Sodium polyacrylate		71	0.53
Latekoll A, (10%)	Ammon. polyacrylate		86	0.26
	SOLUTION POLYMERS			
I (27% in ethyl acetate)	Polymethyl acrylate (K up to 75)		249	0.88
I(40% in toluene)	Polymethyl acrylate (K up to 60)		21	1.00
II (30% in ethyl acetate)	Polyethyl acrylate (K-value 75)		372	1.00
II (60% in toluene)	Polyethyl acrylate (K-value 50–55)		568	1.42
700 (40% in ethyl acetate)	Ethyl acrylate	75	...	...
	Vinyl isobutyl ether (K-value 45–50)	25	...	...
	SOLID POLYMERS			
I	Polymethyl acrylate		32	2.32
II	Polyethyl acrylate		44	2.64
IV	Polybutyl acrylate		4	2.78

Polyvinyl carbazole resin

by W. M. SHINE*

EVEN BEFORE Japan attacked Pearl Harbor, a group of chemists† was actively working upon the development of a possible mica replacement material. Previous work in European laboratories had shown that N-vinyl carbazole when polymerized gave a hard, translucent, thermoplastic material which had unusual electrical properties. Although inherently brittle, it had a high softening point, exceptional heat stability and great resistance to water and chemicals. Hence, in 1942 when the demand for a temporary mica replacement became acute, work was actively pushed toward the development of polyvinyl carbazole. Although the mica shortage fortunately never became the problem that had been anticipated, it was largely responsible for the development in this country of Polectron,[1] a new dielectric material which has found uses in articles which were not suitable for mica (Fig. 1).

Polectron monomer is manufactured commercially in high pressure equipment by the catalytic addition of acetylene to carbazole to make vinyl carbazole. The formula for this reaction is as follows:



When this monomer is polymerized, many of these units join together through the vinyl grouping to form Polectron polymer.

The density and viscosity of commercially available vinyl carbazole monomer are as follows:

Temperature, °C.	*Density, g./cc.*	*Viscosity, cp.*
70	1.094	4.47
80	1.088	3.45
90	1.082	2.69
100	1.075	2.14
106	1.072	..
110	...	1.87
120	...	1.68

Its melting point is 61 to 65° C. Acidic materials, ultraviolet light, oxygen and heat promote its polymerization. It contracts approximately 8 percent during polymerization. Basic materials, including amines, are inhibitors. Mild inhibitors include certain amides such as formamide and dimethyl formamide as well as certain alcohols such as octadecyl alcohol. N-vinyl carbazole becomes darker in color when exposed to ordinary light for an appreciable period. Solvents for the monomer are methyl alcohol, ethyl alcohol, pentane, hexane, cyclohexane, carbon tetrachloride, ethyl acetate, tetralin, dioxane, chloroform, acetone, methylene dichloride and chlorobenzene.

Physiological tests have shown that Polectron monomer can cause dermatitis which in some cases may be very severe. These experiments were fairly extensive but no other toxic symptoms were observed. However, the possibility of other types of toxicity have not been completely eliminated. Therefore, contact with the skin and inhalation of dust and vapors must be avoided.

The outstanding commercial application of the monomer has been in its use as a dielectric impregnant for rolled condensers. This use is based on the fact that electrical assemblies may be impregnated with the molten monomer which is subsequently polymerized by means of heat. A rigid assembly results. The annular condenser which was used in the now famous radio proximity or VT fuze was made by this process.

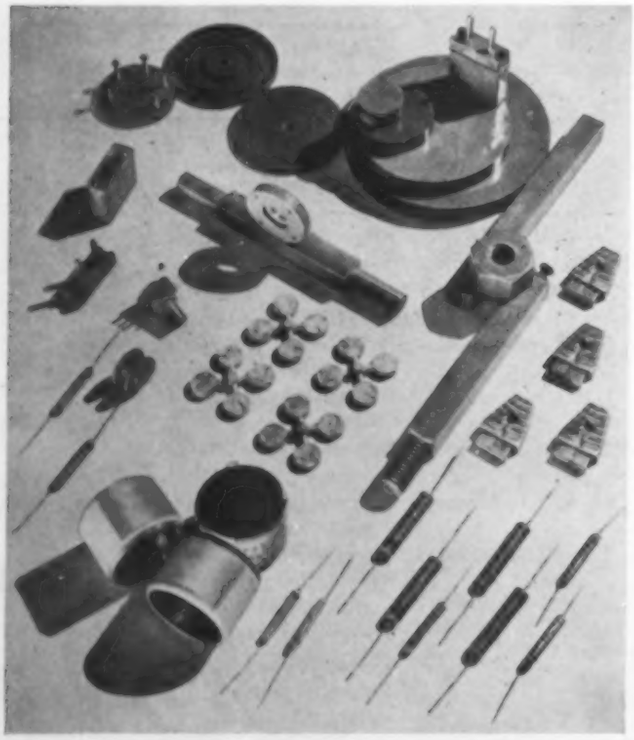
Essentially the fuze was a pint-size but extremely rugged radio transmitting and receiving station which was placed in the nose of a projectile. The condenser was part of the intricate electrical assembly

* General Aniline & Film Corp., New York City.

† All the work was carried out at the Grasselli, N. J., plant of General Aniline & Film Corp. and later at the Central Research Laboratory in Easton, Pa.

[1] Trade-mark registered by General Aniline & Film Corp., New York City.

1—Polyvinyl carbazole is finding wide use as a dielectric material in applications not suitable for mica



which ultimately released its stored electrical energy to set off detonators and subsequently the final damaging force. The cutaway view of a simulated model shown in Fig. 2 clearly shows the many parts which go to complete the mechanism. The annular firing condenser is shown in the upper left hand portion of fuze.

Monomer impregnation process

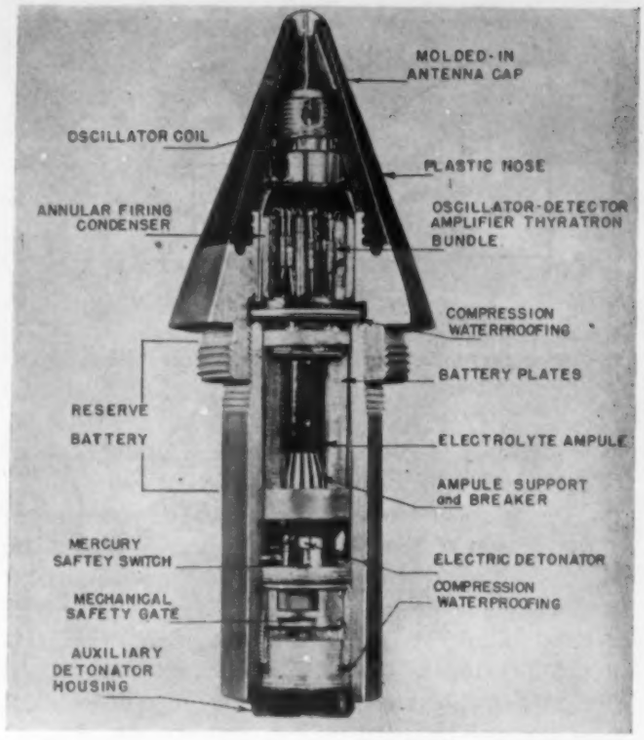
Generally speaking, stationary electrical assemblies may be impregnated with Polectron monomer, using the following laboratory procedure which was developed for the impregnation of rolled paper condensers.

The equipment, shown in Fig. 3, consists essentially of an impregnating chamber (upper oven), a monomer reservoir (lower oven), ovens for heating these chambers, necessary stop-cocks (*A*, *B* and *C*), a McLeod gage and a vacuum pump. The impregnation chamber and the monomer reservoir, which are joined together by means of a tube, are placed in ovens which can be individually heated. The temperature of these chambers is automatically controlled by means of a "Celectray" attachment. The monomer reservoir is so constructed that an inert atmosphere can be introduced above the liquid monomer, thus forcing it up the connecting tube into the impregnation chamber containing the condenser to be impregnated.

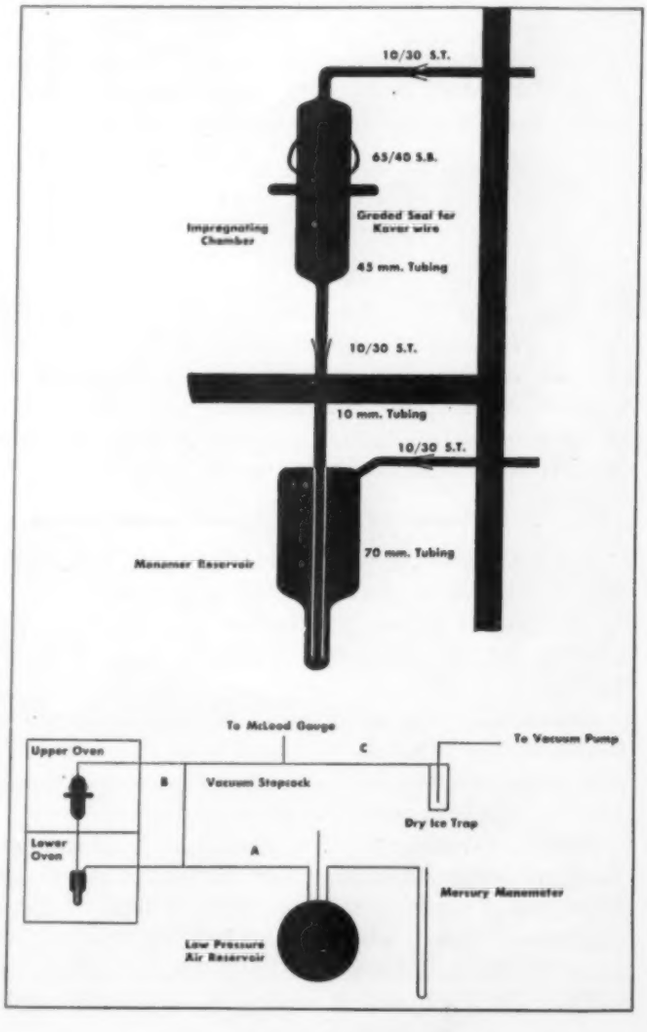
After the condenser is placed in the upper section, the entire system is evacuated to a pressure of 0.05–1 mm. mercury (preferably 0.5 mm. or less) and nitrogen is brought into the system in order to insure an oxygen-free atmosphere. The upper oven is heated to and maintained at a temperature in the region of 105° C. in order to drive off any moisture which might be present in the condenser. It should be noted that the power factor of a green rolled capacitor may be around 0.15 and will drop to less than 0.05 as it is dried. Hence the measurement of the power factor during the drying period serves as an excellent method of following the course of the drying. The time required for this operation is dependent upon many factors such as the size of the capacitor, the type of paper used and the manner in which the condenser is wound.

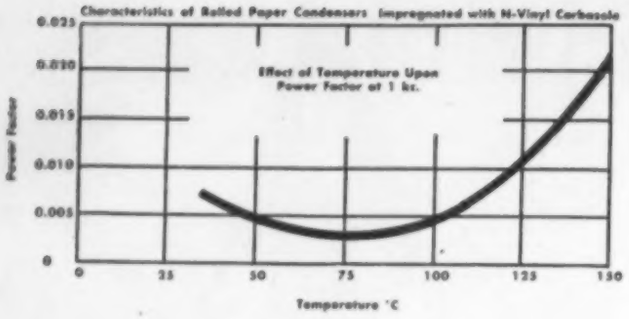
At the same time that the condenser is being dried, the lower oven is heated to some temperature in the range of 70 to 85° C. in order that the monomer may become molten. During the melting period, the monomer also is placed under vacuum so that dissolved air is not present in the monomer during the impregnation.

When the condenser is dry and the monomer is in a molten state, the latter is forced from the reservoir into the impregnation chamber by introducing nitrogen from the low pressure reservoir. The period of impregnation at 70 to 85° C. is dependent upon the size of the condenser, the manner in which it is wound and the materials used in its construction. It may vary from 30 min. to a number of hours. Hence, the preferred time for a specific condenser is best selected by experiments. Capacitance measurements indicate that the impregnation usually is substantially complete after a very few minutes. However, the measurement

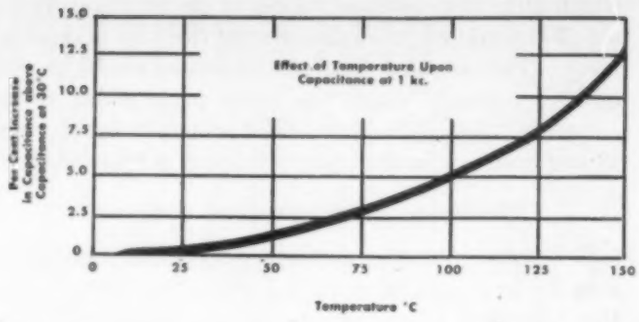


2—This resin was essential for condenser of proximity fuze. 3—Polyvinyl carbazole impregnating equipment





4—*Power factor of condensers varies as shown above*



5—*Condenser capacitance increases with temperature rise*

of capacitance is not sensitive enough to detect small changes such as from 99.5 to 100 percent impregnation which may occur after a few minutes of immersion.

At the end of the desired impregnation period, the monomer is allowed to drain back to the monomer reservoir. While the temperature of the lower oven is lowered in order to freeze the monomer not being used, the temperature of the upper oven is raised in order to bring about polymerization of the monomer in the condenser. This treatment is carried out in the presence of air at temperatures in the range of 120 to 140° C. The course of polymerization is followed by using the insulation resistance as a criterion, inasmuch as the resistance of the polymer is much higher than that of the monomer.

The following data were obtained from an experimental laboratory study of the time required to polymerize N-vinyl carbazole in specific condensers:

70 hr. at 110° C.
15 hr. at 120° C.
8 hr. at 135° C.
5 hr. at 150° C.

It should be noted here that the rate of polymerization of N-vinyl carbazole is readily affected by traces of acidic or basic substances which may be present in the condenser. The former would accelerate polymerization whereas the latter would prolong the time required to polymerize the monomer.

Characteristics of impregnated condensers

Power Factor—The power factor of these condensers at 1 kc. varies as shown in Fig. 4, decreasing from 0.004–0.007 at room temperature to a minimum of 0.003 at 80° C., and then increasing to about 0.014 at 130° C.

Capacitance—The capacitance of these condensers increases approximately 6 percent from 30 to 120° C. and increases somewhat faster at temperatures above 120° C. This is graphically shown in Fig. 5.

Insulation resistance—The insulation resistance of these condensers is considerably higher than most oil impregnated condensers. Experimental tests of these condensers show a resistance of 2000–3200 megohms at 60° C. This drops to 21–25 megohms at 120° C.

There is a convenient means of considering this dielectric property irrespective of the size of the condenser. The direct current resistance (R) of a condenser is directly proportional to the thickness of the dielectric (T) and inversely proportional to the area (A). The capacitance (C) of a condenser is inversely proportional to the thickness (T) and directly proportional to the area (A).

$$R = m\frac{T}{A} \text{ and } C = n\frac{A}{T}$$

$$\therefore \quad RC = mn = \text{a constant.}$$

Thus, if the resistance and capacitance are multiplied, the variables area and thickness are eliminated, and a constant RC is obtained which is independent of the size of the condenser and which allows comparison of the quality of insulation of different condensers. Fig. 6 shows effect of temperatures upon this characteristic.

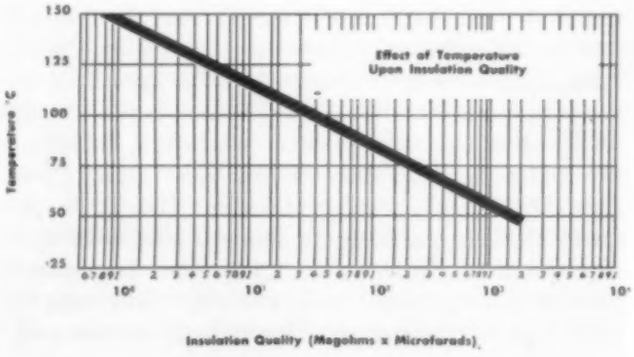
Characteristics of vinyl carbazole polymer

Polectron polymer is a gray to light brown thermoplastic material which is commercially available in a form varying from powder to broken lumps. This material's outstanding characteristics are its excellent electrical properties which are retained even at elevated temperatures and over a broad frequency range (Figs. 7 and 8), and its high heat distortion point (Fig. 9). Creep of polyvinyl carbazole is relatively low. The material is subject to slight discoloration by sunlight.[2]

It is resistant to paraffinic (*Please turn to page 216*)

[2] The properties of polyvinyl carbazole are listed in detail on the 1947 Plastics Properties Chart in the 1947 MODERN PLASTICS ENCYCLOPEDIA.

6—*Effect of temperature on insulation quality is shown*



Plastics Digest

This digest includes each month the more important articles of interest to those who make or use plastics. Mail request for periodicals directly to publishers.

General

NYLON IS BIG BUSINESS. Chemical Industries *60*, 776–9 (May 1947). The production and applications of nylon are reviewed. Twelve different nylon plastics are being made. Nylon accounts for 15 percent of the total sales of E. I. du Pont de Nemours & Co., Inc.

CANADA'S PLASTIC I.Q. Canadian Plastics *5*, 16–18 (Jan. 1947). The results of a survey of 1044 Canadians on various general informational questions on plastics are reported. Four out of five men and two out of three women said they know what plastics are, yet more than half of the men and nearly two-thirds of the women could not name any particular plastic. The results indicate a very pressing need for consumer education concerning plastics materials.

MOLDING POLYTETRAFLUOROETHYLENE. British Plastics *19*, 163–5 (Apr. 1947). Technique for molding or forming shapes of polytetrafluoroethylene is described. Finely divided polymer is pressed at 25,000 to 50,000 p.s.i. at temperatures between 15 and 327° C. Shape is then sintered at 327 to 400° C. The time depends on the size of the shape. The heating may be done in air, oils or molten metals. Quenching the hot piece results in increased toughness.

Materials

EXPERIMENTS ON THE COLORATION OF MASS POLYVINYL CHLORIDE MIXTURES. F. Gournay. Rev. gén. caoutchouc *23*, 12–16 (1946); Chem. Abstracts *40*, 6882 (Nov. 10, 1946). A large number of pigments and dyes were investigated for use with polyvinyl chloride. The intensity, stability to light and heat, solubility and tendency to migrate were investigated. It is shown that the chemical constitution of the coloring agent has a great influence on affinity for polyvinyl chloride. Nitro, most azoxy, polyazo, hydrozone, quinoline and sulfur dyes have poor affinity for polyvinyl chloride. Aminoazo, hydroxyquinone and diphenyl methane derivatives have fair affinity. Aminoquinones, triphenyl methane derivatives, phthaleins and quinoneimides are the best. Acidity is not a factor since good and poor colors are found in both the acidic and basic dye groups.

TAILOR-MADE WAXES. Chemical Industries *60*, 766–7 (May 1947). The manufacture of a group of synthetic waxes is reported. Properties are given.

PVC NEAT. Chemical Industries *60*, 939–40 (June 1947). The formulation and applications of polyvinyl chloride pastes are discussed. These consist of powdered polyvinyl chloride suspended in a liquid plasticizer. Simple heating converts this paste to the familiar plastic state.

Plasticizers

SURVEY OF PLASTICIZERS FOR VINYL RESINS. M. C. Reed. J. Polymer Sci. *2*, 115–20 (Apr. 1947). For satisfactory performance in vinyl chloride acetate resins, plasticizer must be compatible with the resin in a wide range of concentration. Low volatility, low rates of extraction by oil and water, and good chemical stability are necessary in most applications. In special applications good electrical properties, low flammability, preservation of compound flexibility at low temperatures, and freedom from odor and taste are also required. Physical test methods, suitable for the evaluation of plasticizers, are briefly described.

CREEP BEHAVIOR OF PLASTICIZED VINYLITE VYNW. W. Aiken, T. Alfrey, Jr., A. Janssen and H. Mark. J. Polymer Sci. *2*, 178–98 (Apr. 1947). The visco-elastic properties of plasticized Vinylite resin VYNW were studied over a wide range of time scale by means of the tensile creep test. A number of different plasticizers were compared as to their plasticizing effectiveness. It was found that different plasticizers imparted distinctly different shapes to the creep curve of the plasticized resin. The flat creep curve, characteristic of trioctyl phosphate, is considered to be superior to the steep creep curve of tricresyl phosphate. Mixtures of plasticizers were also studied. A number of conjectures are advanced concerning the molecular mechanism of plasticizer action. One important characteristic of a plasticized formulation of the polyvinyl chloride type of resin is the existence of a three-dimensional gel structure of great permanence which prevents the occurrence of irrecoverable viscous flow.

Molding and fabricating

RECENT PROGRESS IN THE WELDING OF THERMOPLASTICS. G. Haim and H. P. Zade. Plastics (London) *11*, 66–71 (Feb. 1947). Progress since 1945 in the welding of thermoplastics is reviewed. This article covers 26 patents and contains a total of 11 literature references.

GRAPHITE AIDS ELECTRO-DEPOSITION OF METALS ON PLASTICS. A. H. Stuart. Plastics (London) *11*, 61–4 (Feb. 1947). The surfaces of plastic objects are coated with graphite to aid the electrodeposition of metals on them. Colloidal graphite dispersed in water gives the films of graphite. The procedure, precautions and limitations are discussed.

Applications

PLASTICS FOR BUSES. C. C. Bailey. British Plastics *19*, 77–9 (Feb. 1947). The general problem of utilizing plastics in the construction of buses is discussed. Plastics have not been used as fully as possible for this purpose because of their high cost compared with that of other materials.

MODERN APPLICATIONS OF PLASTIC OPTICAL MATERIALS. Plastics (London) *11*, 117–21 (Mar. 1947). The properties of transparent methacrylate and polystyrene plastics are reviewed with particular emphasis on properties of interest in optical applications. Methods for finishing optical parts are described.

Coatings

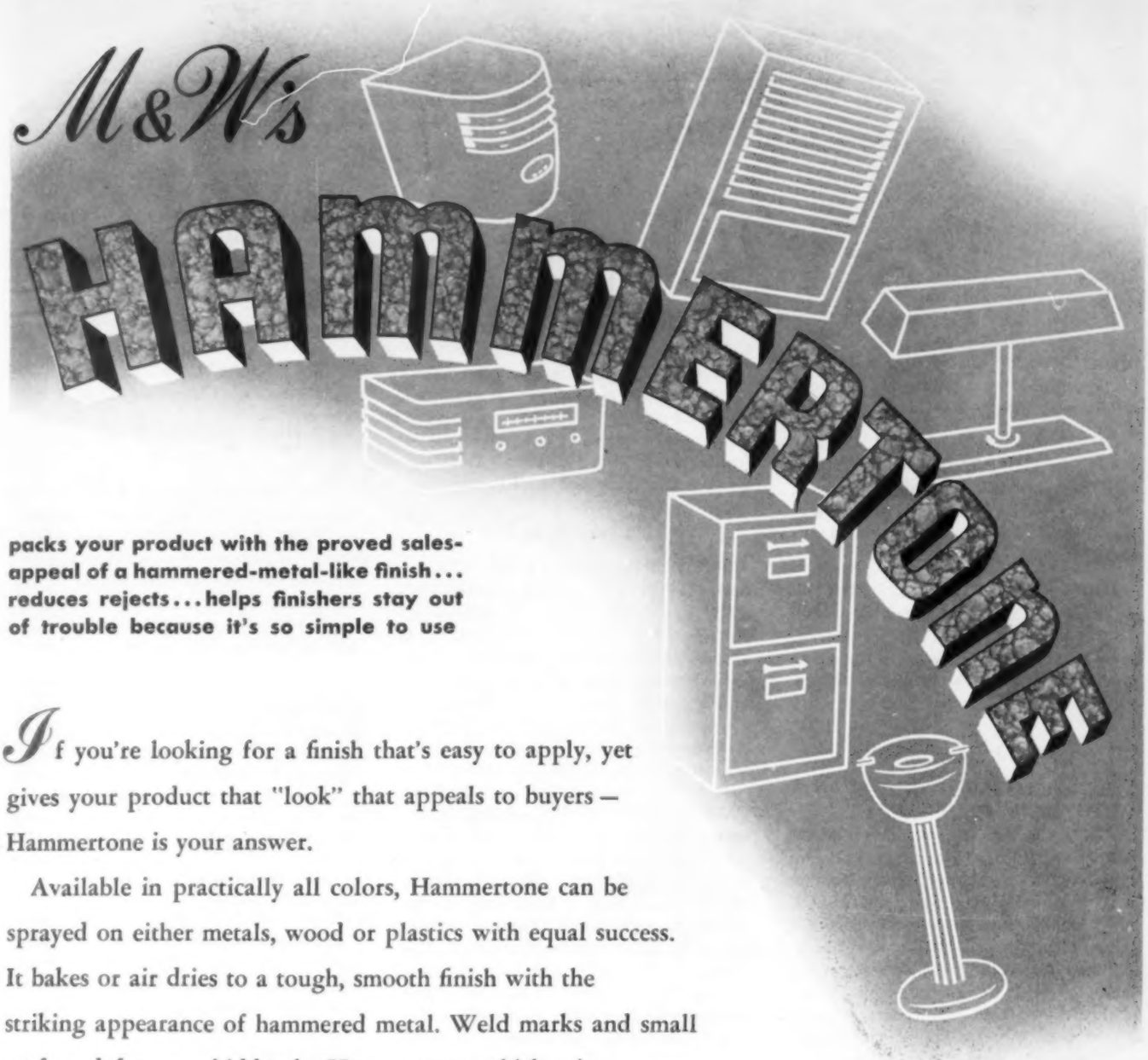
PROTECTIVE ORGANIC COATINGS AS ENGINEERING MATERIALS. J. J. Mattiello. A.S.T.M. Edgar Marburg Lecture 1946. 100 pp. The application of scientific knowledge to the solution of coating problems is stressed. Many of the principles are discussed and their applications indicated. The coating industry is emerging from the cook book stage into an industrial science. The author has gathered together and organized the outstanding contributions of many workers in this field. The role of plastic and resin materials is a major one in coating industry. Fifty-four references.

STOVING AND HEAT-RESISTING FINISHES. I. R. L. Frost. Paint Manuf. *16*, 294–300 (1946). Resins for formulating heat-resistant finishes are discussed.

COCOONING Modern Packaging *20*, 112–13 (May 1947). Large pieces of machinery and equipment are packaged by spraying with a compound which forms a web or cocoon connecting the spaces between pieces of tape wrapped around the article. This cocoon is then covered with five coats of plastic materials. The fourth coat has an asphalt base and the last is pigmented with aluminum powder.

Sure Cure for Finishing Room Headaches...

M&W's HAMMERTONE



packs your product with the proved sales-appeal of a hammered-metal-like finish... reduces rejects... helps finishers stay out of trouble because it's so simple to use

If you're looking for a finish that's easy to apply, yet gives your product that "look" that appeals to buyers — Hammertone is your answer.

Available in practically all colors, Hammertone can be sprayed on either metals, wood or plastics with equal success. It bakes or air dries to a tough, smooth finish with the striking appearance of hammered metal. Weld marks and small surface defects are hidden by Hammertone, which — in addition to its uniform results in application — reduces rejects to a minimum.

For further information, write for Technical Data Bulletin #115 or ask your M&W representative. Color card is available.

PIONEERS IN PROTECTION

M.&W.Co. 1876

. . . where industry goes with finishing problems

MAAS & WALDSTEIN COMPANY NEWARK 4, NEW JERSEY

1658 Carrol Avenue, Chicago 12 • 6 Jersey Street, Boston 15 • 10751 Venice Blvd., Los Angeles 34

PRODUCERS OF LACQUERS, ENAMELS, SYNTHETICS AND SPECIALIZED PRODUCTION FINISHES

Technical Briefs

Abstracts of articles on plastics in the world's scientific and engineering literature relating to properties and testing methods, or indicating significant trends and developments.

Engineering

OBTAINING BRILLIANCE WITH ACRYLIC RESINS. H. F. Pearson. Product Eng. *18*, 147–51 (May 1947). Methods of design to increase the brilliance of objects made of transparent methyl methacrylate plastics are discussed. These include laws of interior reflection, the phenomenon of light piping and methods of obtaining prismatic brilliance.

CUTTING "BAKELITE" LAMINATE BY THE BAND SAW METHOD. H. J. Chamberland. Canadian Plastics *5*, 22 (Jan. 1947). The technique for cutting phenolic laminates with a band saw is described.

HIGH CENTRIFUGAL FIELDS. J. W. Beams. J. Washington Acad. Sci. *37*, 221–41 (July 15, 1947). The theory, types, construction and some of the recent applications of ultracentrifuges are reviewed. Forty-five references.

Chemistry

INFRARED SPECTRA OF THE METHYLPOLYSILOXANES. N. Wright and M. J. Hunter. J. Am. Chem. Soc. *69*, 803–9 (Apr. 1947). The infrared absorption spectra of 15 methylpolysiloxanes were recorded in the range 2–14 μ. A rough classification is made of the types of vibration involved in the stronger bands. It is shown that the great intensity of the bands involving the silicon-oxygen linkage confirms the large ionic character predicted from electronegativity difference. Comparatively weak carbon-hydrogen vibration bands of the groups silicon-methyl indicate a dipole moment of the methyl group considerably smaller than in compounds where carbon replaces the silicon.

THE FRACTIONAL PRECIPITATION OF MOLECULAR-WEIGHT SPECIES FROM HIGH POLYMERS. D. R. Morey and J. W. Tamblyn. J. Phys. & Colloid Chem. *51*, 721–46 (May 1947). Existing theories accounting for the selective precipitation of increasing chain lengths are reviewed. These theories are: a) that of G. V. Schulz, a treatment based upon considering the potential energy of a chain molecule when in the solution or in the precipitate phase; b) a thermodynamic treatment, developed by Flory, Gee and Huggins, in which a calculation of activities is made and used to predict phase separation conditions; and c) a theory in which the precipitate phase is considered as a consequence of the opposing rates of solution and aggregation. With this last theory, by including a separate term for the influence of end groups, the type of fractionation in which short chains are less soluble than the long ones can be accounted for. This reverse-order effect is further studied and shown to be independent of temperature but dependent upon concentration. The opposing rate theory is shown to be in accord also with experimental data on normal-order precipitations. The efficiency of fractionation is also discussed from the viewpoint of these studies: 31 references.

Properties

THE STRESS-STRAIN RELATIONSHIP OF NYLON UNDER BIAXIAL STRESS CONDITIONS. J. Miklowitz. J. Colloid Sci. *2*, 217–22 (Feb. 1947). A method is presented by which the stress-strain characteristics of nylon under equi-biaxial tensile stress were investigated. The results of the test made are used for comparison with the applied single-stress condition, under which nylon showed a well-defined yield point and localized yielding. Nylon membrane yielded under an equi-biaxial load stress of 3600 p.s.i. at 0.3 strain. The stress gradually dropped to 3050 p.s.i. at 1.08 strain. Comparing this test with that of the nylon fiber in tension, it may be said that both experience practically the same flow point. The essential difference is the drop in stress during the yield-point elongation of the membrane, whereas the fiber yields under a constant stress. Comparing the true stress curves of ordinary tension and equi-biaxial tension, it may be seen that the former has points above those of latter.

DIFFUSION OF VAPORS IN FILMS. P. E. Rouse, Jr. J. Am. Chem. Soc. *69*, 1068–73 (May 1947). A method is given for calculating the diffusion coefficient of a vapor within a film as a function of concentration. Data required are the permeation rates under several vapor pressure differences and the sorption isotherm. The method also furnishes a means for constructing the gradients of the effective vapor pressure and of the concentration of the vapor within the film through which vapor is passing at a steady rate. Data are presented for water permeation and water sorption of polythene and nylon, and the diffusion coefficients of water vapor in these films at 25° are obtained as functions of concentration. Curves representing the vapor pressure and concentration gradients are also presented.

LINEAR SHRINKAGE OF PHENOLIC MOLDINGS. S. W. Hargreaves and J. H. Martin. British Plastics *19*, 216–21 (May 1947). The shrinkage of various types of phenolic plastics during heating at 110° C. for prolonged periods was investigated. Preheating the molding powders 30 min. at 90° C. prior to molding produced more stable moldings than parts molded from powder as it was received.

Testing

LOW-TEMPERATURE WVT. S. W. Pierce and J. F. Helms. Modern Packaging *20*, 161–4 (Apr. 1947). A method for determining the water-vapor transmission of frozen food packages by passing a controlled current of dried gas through a sealed cell to pick up water vapor emanating from the sample is described.

HYGROMETRIC TEST OF WVP. J. A. van den Akker. Modern Packaging *20*, 148–51, 204, 206 (May 1946). Hygrometric methods for determining water-vapor permeability are described. Construction of a special electric hygrometer based on polyvinyl acetate and lithium chloride is described.

Synthetic rubber

MERCAPTANS AS PROMOTERS. I. M. Kolthoff and W. E. Harris. J. Polymer Sci. 2, 41–8 (Feb. 1947). The rate of emulsion copolymerization of butadiene and styrene, with soap as emulsifier and potassium persulfate as catalyst, is extremely small at 50° C. The presence of very small amounts of high-molecular mercaptans promotes the copolymerization reaction. The promoting effect is at a maximum for primary, secondary and tertiary dodecyl mercaptans and decreases for mercaptans of either higher or lower molecular weight. The promoting effect is independent within wide limits of the amount of mercaptan added after the minimum quantity has been exceeded. Mercaptans which are poor promoters may be so because they fail to bring about chain initiation or because they aid in chain termination. The low-molecular mercaptans which are poor promoters prevent the high-molecular mercaptans from exerting their good promoting effect when a mixture of both types of mercaptans is used. The mechanism of the promoting effect of mercaptans upon the emulsion copolymerization of butadiene (75 parts) and styrene (25 parts) or upon polymerization of butadiene alone is not yet clear.

when

in

doubt

specify

No. 5015 **PLYOPHEN** the water soluble

impregnating resin of a thousand uses!

Looking for a low-cost liquid resin that penetrates deeply and quickly into wood, canvas, asbestos, paper and other laminating and molding stocks? Want a resin for molding compounds conferring excellent water and chemical resistance? Need a resin which can be diluted as much as 8 to 10 parts water to 1 part resin for spraying glass fiber or rock wool, for manufacturing Compreg or incorporating with lignin? Then specify No. 5015 Plyophen . . . new uses for which are being developed daily. Send for a working sample and apply it to your problem. The chances are good that it will be the ideal, economical answer. Write direct to the Sales Department in Detroit for details of properties and uses.

REICHHOLD CHEMICALS, INC.

RCI

General Offices and Main Plant, Detroit 20, Michigan

Other Plants: Brooklyn, New York • Elizabeth, New Jersey • South San Francisco, California • Seattle, Washington • Tuscaloosa, Alabama
Liverpool, England • Paris, France • Sydney, Australia • Zurich, Switzerland • Milan, Italy • Rio de Janeiro, Brazil

SYNTHETIC RESINS • CHEMICAL COLORS • PHENOLIC PLASTICS • INDUSTRIAL CHEMICALS

U. S. Plastics Patents

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 25 cents each.

ADHESIVE. M. L. Ernsberger and P. S. Pinkney (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,418,018, Mar. 25. A laminated article comprising a sheet of methyl methacrylate polymer and a sheet of polyvinyl butyral resin, said two sheets being joined together by an adhesive comprising an acid polysilicic acid ester.

SILICON POLYMERS. D. W. Scott (to General Electric Co.). U. S. 2,418,051, Mar. 25. Polycyclic methylpolysiloxane.

HEAD GEAR. W. R. P. Delano (to Richard Delano, Inc.). U. S. 2,418,069, Mar. 25. A hat comprising a crown portion and a brim portion formed of flexible films of gasproof organic plastic material, said films being sealed together at the edges of the brim so as to divide interior into gas cells, and means to inflate cells with gas.

PLYWOOD. J. S. Stewart (to Curved Plywood Products Co.). U. S. 2,418,100, Mar. 25. A machine for making plywood in curved shapes, comprising a die shaped to conform to the desired shape, a flexible belt adjacent to the die on which layers of veneer and bonding material may be positioned, means for holding the belt taut, means for forcing the die toward the belt, thereby pressing the veneer against the die, and means for pressing the rolls toward each other whereby, when the die is forced against the veneer, the veneer and belt will be carried between the rolls.

BITUMINOUS ADHESIVE. S. A. Moore and T. Greenfield (to Interchemical Corp.). U. S. 2,418,135, Apr. 1. A thixotropic adhesive composition comprising a petroleum naphtha, blown asphalt, hard stearine pitch, coumarone indene resins and petroleum hydrocarbon polymers of high temperature cracked recycle stock.

PLASTIC ARTICLES. B. Bogoslowsky. U. S. 2,418,155, Apr. 1. A collapsible tube is prepared by deforming one end of a cylindrical tubular blank containing thermoplastic material.

CONTAINER. H. E. Griffith (to Monsanto Chemical Co.). U. S. 2,418,172, Apr. 1. In a gasoline container characterized by the ability to self-seal after the passage of a bullet through it, a wall having, consecutively, a layer of tough wear-resistant material, a layer of gasoline-swellable material, a layer of elastic material, a layer of swellable material and an inner layer of gasoline-insoluble polyvinyl acetal resin containing 5 to 21 percent hydroxyl groups.

SHOE CONSTRUCTION. K. A. Stritter (to United Shoe Machinery Corp.). U. S. 2,418,204, Apr. 1. A shoe having an outsole of heavy stock attached by a seam comprising a continuous thread of flexible plastic fibers having latent adhesive and cohesive properties.

CELLULAR MATERIAL. J. G. Williams (to British Celanese, Ltd.). U. S. 2,418,211, Apr. 1. Cellular material is prepared from an organic cellulose derivative by forming an ester or ether of cellulose into a gel containing a solvent, transferring to a liquid bath that is non-solvent for the resin but is miscible with the solvent in the gel and replaces the latter, and effecting evaporation of said non-solvent at a temperature insufficiently high to collapse the gel structure.

CELLULOSE ACETATE. L. W. Georges (to U. S.). U. S. 2,418,224, Apr. 1. A film-forming composition comprising cellulose acetate and, as plasticizer therefor, an aryl ester of mono- or di-morpholido phosphoric acids.

ABRASIVE. C. E. Drake (to U. S. Rubber Co.). U. S. 2,418,249, Apr. 1. An abrasive article comprising abrasive grains and a bond containing the vulcanization product of a mixture of rubber, sulfur and an organic polysulfide polymer.

RESINS. E. Farber (to Polymer Chemical Co., Inc.). U. S. 2,418,293, Apr. 1. The qualities of a thermoplastic resin are changed by heating to at least 300° C. a mixture of a cellulose-containing material with the resin acids of tall oil, mixtures of such acids with the fatty acids in tall oil, or rosin, the quantity being at least equal in weight to that of the cellulosic material, and mixing therewith hexamethylenetetramine.

ORNAMENTAL FABRIC. D. D. Whyte and N. Klein (to D. D. Whyte). U. S. 2,418,327, Apr. 1. A flexible decorative structure comprising a number of units of moldable plastic material, a plurality of flexible strips juxtaposed to portions of the units embodying integrally formed, spaced projecting elements passing through the flexible strips and adapted to be secured to the units.

DIELECTRIC SHEET. E. A. Kern and H. F. Miller (to General Electric Co.). U. S. 2,418,354, Apr. 1. A dielectric material including wood fiber paper loaded with barium strontium titanate powder and a coating of resinous material.

VINYLIDENE CHLORIDE. S. Pellerano (to Kaydon Engineering Corp.). U. S. 2,418,423, Apr. 1. In the molding or shaping of vinylidene chloride polymers wherein said polymers are converted to a molten mass, the step comprising maintenance of contact with a cadmium-base alloy whereby decomposition is prevented.

COPOLYMERS. L. M. Richards (to E. I. du Pont de Nemours & Co., Inc.). U. S 2,418,426, Apr. 1. Copolymers are prepared by exposing a mixture of a vinyl ester of a carbothiolic acid, a neutral ester of a saturated monohydric alcohol with 1,4-butenedioic acid, and an acyloin to ultraviolet light for sufficient time to produce substantial polymerization.

CURVED LAMINATE. V. E. Watts. U. S. 2,418,438, Apr. 1. Curved laminar structures of large dimensions are produced by providing a rigid form, building up thereon a number of plies having interposed layers of adhesive, applying pressure to all of a predetermined segment of the curved surface in a direction normal to the surface at all points thereof by fluid under pressure, applying heat to an intermediate part only of said segment, precluding application of heat to that marginal part of the curved surface adjacent to the area not under pressure and repeating the application of heat and pressure to successive adjacent segments until all of the surface has been bonded.

CELLULOSE DERIVATIVES. W. J. Burke (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,418,498, Apr. 8. An organic solvent-soluble hydroxyl-containing cellulose derivative such as cellulose esters having cellulosic hydroxyl hydrogen replaced by a methylene group which is in turn attached through oxygen to a monovalent radical containing an ester group.

VINYL RESINS. R. D. Glenn (to Carbide & Carbon Chemicals Corp.). U. S. 2,418,507, Apr. 8. A spinnable dispersion of vinyl resin in volatile spinning solvent is prepared by mixing such a resin with said solvent at an elevated temperature to form a dispersion, filtering under pressure, and spun by conducting to a spinning operation while at a temperature within the range between 30 and 55° C. and at some stage prior to spinning, heating for at least 5 min. to between 80 and 100° C. but above the boiling point of the solvent at atmospheric pressure while under superatmospheric pressure sufficient to minimize local evaporation of solvent.

(Please turn to the next page)

SWIMBO

THE PLASTIC FISH THAT ACTUALLY SWIMS

Another IN A SERIES OF CASE HISTORIES IN WHICH FELSENTHAL TAKES IT FROM BLUEPRINT TO PRODUCT IN PLASTICS

At last Swimbo is definitely "launched" and it's the toy sensation of the year! Here's a prime example of Felsenthal "productioneering". It's an engineering masterpiece — an injection molded, production-line assembled, mechanical plastic fish that swims more like a fish than a real fish does.

Our engineers were faced with a tough designing problem. The fish had to be designed so that it could be molded and assembled quickly and, above all, economically. The problem was further complicated by the fact that, in its finished form, the swimming motion had to be realistic. Furthermore, time was of the essence. A deadline had to be met in order to get the fish on the market. Our engineers did themselves proud. Working night and day they came up with a practical design which made the assembly operation a matter of few minutes. We created an injection mold *in 7 weeks*, which gives us complete parts for 2 fish for each "shot".

As a result of Swimbo's popular price, made possible by Felsenthal planning and engineering, the toy is now headed for wide popularity.

If you have a "Swimbo" among your blueprints or your patents, whether it be a toy or an industrial application, why not let us look it over? Chances are we can do a good job for *you*, too.

The above photograph illustrates a "shot" from the 16-cavity mold which produces two Swimbos for each injection cycle.

Swimbo is molded and assembled for Bantam-U. S. Toy Co., 2 E. 34th St., New York 16, N. Y. Patent No. 1928418. Foreign Patents and other Patents Pending.

FELSENTHAL PLASTICS

INJECTION MOLDING • LAMINATING • FABRICATING

G. FELSENTHAL & SONS, INC.

4120 W. GRAND AVENUE • CHICAGO 51, ILLINOIS

Ask on your letterhead for our new booklet "No. 7"

COMPACT. W. B. Crane (to Allied Plastics Co.). U. S. 2,418,578, Apr. 8. A plastic compact and clasp therefor.

ETHYL CELLULOSE. M. T. Harvey (to Harvel Research Corp.). U. S. 2,418,583, Apr. 8. A gel comprising ethyl cellulose and a product obtained by heating between 140 and 600° F. a mass of an alkyl ester of abietic acid having between one to four carbon atoms in the alkyl group and while in the heated condition agitating in the presence of a free oxygen-containing gas until the viscosity of 25° C. has increased at least 50 percent.

ALKYD RESINS. C. Gould (to Marco Chemicals, Inc.). U. S. 2,418,633, Apr. 8. A polymerizable unsaturated alkyd resin is treated by heating with *n*-propyl alcohol in an amount and for a time sufficient to effect a reaction between the resin and the alcohol and to introduce between 0.02 and 0.75 mol of alcohol per mol of unsaturated dibasic acid and reacting the propylized alkyd with acetic anhydride to esterify free hydroxyl groups.

BOAT CONSTRUCTION. V. Harasty. U. S. 2,418,636, Apr. 8. A boat consisting of a laminated wood keel composed of parallel wooden strips bonded by a cold-setting waterproof glue.

ELASTIC POLYMER. F. C. Atwood (to National Dairy Products Corp.). U. S. 2,418,688, Apr. 8. An elastic substance having properties similar to vulcanized natural rubber is prepared by milling the copolymer of 95 parts of methyl acrylate and 5 parts of maleic anhydride and admixing therewith during the milling about one half mol of ethylene glycol for each mol of maleic anhydride, molding the product and heating the same to a temperature of 130° C., the amount of said ethylene glycol admixed with the polymer during milling and the extent of the heating at said temperature being such as to eliminate plastic flow and to provide the aforementioned properties.

CELLULOSE DERIVATIVES. W. G. Cameron and T. H. Morton (to Courtaulds, Ltd.). U. S. 2,418,696, Apr. 8. The dyeing properties of cellulosic material are improved by treating with an aqueous solution containing an aliphatic aldehyde and a hydroxyethyl, biguanide ethyl, ethyl-amino, triethylene triamino, or cyclic radical substituted diethylene triamine, said substituted group being further substituted with a radical such as hydroxyethyl or cyclic radicals, drying the treated material and heating to complete the reaction between the aldehyde and the said compound.

RESIN. C. Opp (to Interchemical Corp.). U. S. 2,418,721, Apr. 8. A resin consisting of the reaction product of two parts of succinic anhydride, one part of glycerol, and one part of ethylene glycol characterized by its inertness to high octane gasoline and plasticizing effect on cellulose acetate.

OLEFIN POLYMERS. V. Voorhees (to Standard Oil Co.). U. S. 2,418,797, Apr. 8. An unsaturated hydrocarbon liquid is polymerized by continuously moving a film of said unsaturated hydrocarbon liquid on a moving surface within a catalytic polymerization zone, maintaining an atmosphere of catalyst therein, simultaneously maintaining said film at low temperature in the area where polymerization occurs, thereby preventing overheating and producing high molecular weight polymers.

MOLDING APPARATUS. A. J. Desimone (to Columbia Protektosite Co., Inc.). U. S. 2,418,823, Apr. 15. An apparatus for molding wire core temples.

METHYL METHACRYLATE. D. A. Fletcher and F. L. Johnston (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,418,828, Apr. 15. A saturated aliphatic alcohol ester of methacrylic acid is polymerized by forming an aqueous dispersion of the monomer containing benzoyl peroxide at a temperature below 80° C., heating to cause the temperature to rise to at least 110° C. and completing the polymerization between 110° C. and the depolymerization temperature, the process being so controlled that the monomeric ester is not in contact with the benzoyl peroxide for more than 15 min. within the range 40 to 110° C. nor for more than 10 min. within the range 80 to 110° C.

DENTURE. L. W. Harris and L. W. Colton. U. S. 2,418,833, Apr. 15. A laminated denture comprising a portion of glass fabric impregnated with a modified vinyl butyral, a portion of acrylic resin bonded to said fabric on the exposed side of the denture and a portion comprising a mixture of acrylic resin and polystyrene, bonded to the fabric on the tissue side of the denture.

MOLDING. T. F. Stacy (to French Oil Mill Machinery Co.). U. S. 2,418,856, Apr. 15. Improvement in injection molding device.

COMPOSITE STRUCTURES. E. W. Rugeley and T. A. Feild, Jr. (to Carbide & Carbon Chemicals Corp.). U. S. 2,418,904, Apr. 15. A composite structure of thermoplastic material, which is resistant to deformation by punching, tearing and stretching forces, comprising one sheet element formed from a vinyl resin such as a vinyl halide-ester copolymer and permanently united therewith a filamentary reinforcing element formed from a vinyl chloride-acrylonitrile copolymer resin.

INTERPOLYMER. W. J. Sparks and R. M. Thomas (to Standard Oil Development Co.). U. S. 2,418,912, Apr. 15. A solid plastic hydrocarbon interpolymer which is reactive with sulfur to give an elastic product is prepared by reacting an aliphatic isoolefin having four to six carbon atoms with a polyolefin having more than two double bonds, at least two of which are conjugated, at a temperature between 0 and −165° C. in the presence of a polymerization catalyst comprising a Friedel-Crafts catalyst which is dissolved in a suitable solvent.

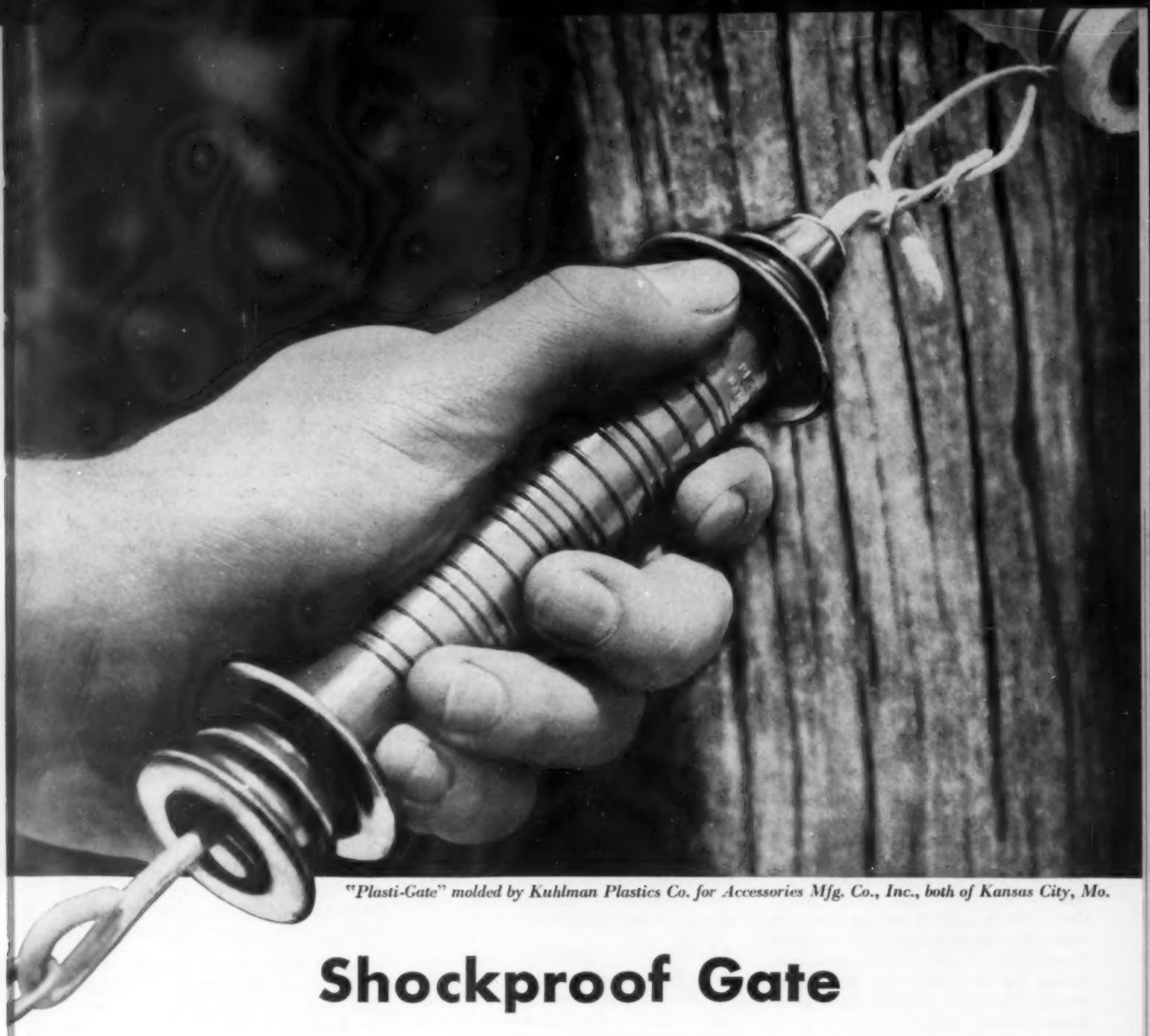
POLYMERS. E. F. Izard (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,418,938–9, Apr. 15. A saturated macromolecular organic compound having at least one recurring unit linked together and containing sulfur, and wherein the first valence of a bivalent sulfur atom is attached through a methylene group to a carbon atom attached to oxygen which is attached to the macromolecular compound; a carbon atom which is attached to both an oxygen atom directly attached to the chain and to a second oxygen atom by only one bond; or a carbon atom which is attached to both an oxygen atom directly attached to the chain of the macromolecular compound and to a second oxygen atom by two bonds, the second valence of the sulfur atom being satisfied by hydrogen or another bivalent sulfur atom whose second valence is satisfied in exactly the same manner as is that of the first sulfur atom.

POLYMERS. E. F. Izard (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,418,940, Apr. 15. The reaction product of an alkane thiosulfate and a saturated macromolecular organic compound having at least one recurring unit linked together in a chain, an average molecular weight in excess of 1000, and a reactive ester group comprising a halogen ester, a sulfate ester, or a sulfonate ester.

THIOUREA DERIVATIVES. E. F. Izard (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,418,941, Apr. 15. The isothiourea derivative of a macromolecular organic compound having at least one recurring unit linked together, an average molecular weight in excess of 1000, and at least one reactive ester group such as a halogen ester, a sulfate ester, or a sulfonate ester and wherein the isothiourea group is attached through the sulfur atom to the macromolecular chain.

SULFUR-CONTAINING POLYMERS. P. W. Morgan (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,418,942, Apr. 15. The method comprising reacting hydrogen sulfide in the presence of pyridine with cellulose acetate *p*-toluene sulfonate.

HARDENING POLYMERS. W. Mertens (to Attorney General). U. S. 2,418,978, Apr. 15. Electrically insulating articles are produced by preparing a homogeneous mixture of polyisobutylene, styrene and *p*-divinylbenzene, and applying heat until a soft rubberlike composition results. (*Please turn to next page*)



"Plasti-Gate" molded by Kuhlman Plastics Co. for Accessories Mfg. Co., Inc., both of Kansas City, Mo.

Shockproof Gate

TENITE makes it safe to open electric farm fences with bare hands, even in wet weather. A shock-free Tenite "gate"—actually a lightweight handle covering a metal spring that maintains electrical contact between two ends of wire—unhooks to let traffic through.

Effective electrical insulation is *one* property of Tenite that makes it an ideal material for this fence gate—and for many other applications, including handles of linesmen's pliers and wrenches, fuse testers, and screws for electrical instrument panels. Added to this property are weather resistance, extreme toughness, and easily visible, peel-proof color—all important to the complete success of the article in use.

Tenite is rapidly formed by injection molding, and also by the process of continuous extrusion. The many excellent physical properties of this thermoplastic material suit it to a wide variety of uses. To obtain complete information about Tenite, and the Tenite formulas which best serve your products, write to TENNESSEE EASTMAN CORPORATION (Subsidiary of Eastman Kodak Company), KINGSPORT, TENNESSEE.

TENITE AN EASTMAN PLASTIC

POLYMERS. E. C. Shokal and R. C. Morris (to Shell Development Co.). U. S. 2,418,991, Apr. 15. A resin comprising a polymer of an ether of 3-sulfolanol, the other member of the ether comprising an alken-2-yl radical of 3 to 18 carbon atoms.

POLYVINYL FLUORIDE. D. D. Coffman and T. A. Ford (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,419,008–9, Apr. 15. Polyvinyl fluoride is prepared by heating vinyl fluoride in contact with water in an amount between 0.1 and 10 times the weight of the vinyl fluoride and with a vinyl polymerization catalyst under pressure in excess of 100 atmospheres and at a temperature between 30 and 250° C.

POLYVINYL FLUORIDE. D. D. Coffman and T. A. Ford (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,419,010, Apr. 15. A xylene-insoluble polyvinyl fluoride which has an intrinsic viscosity of at least 0.35 and which, when in the form of a filament, is capable of being cold-drawn to a permanent elongation of at least 100 percent from a molecularly unoriented state exhibiting an X-ray diffraction pattern characteristic of a crystalline powder to an oriented state showing X-ray diffraction pattern orientation along the fiber axis.

MOLDING POWDERS. J. L. Quinn and E. G. Spader (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,419,035, Apr. 15. A molding powder is prepared by mixing in a dough mixer a soluble derivative of cellulose such as a cellulose organic ester or a cellulose ether, a plasticizer, and a hot-acting volatile solvent at a temperature above the effective point of the solvent to form a homogeneous mass, cooling the mass below the solvent temperature, breaking the mass into small pieces, feeding said pieces into a screw stuffer and extruding therefrom, at a temperature above the effective point, strands of small cross section, cutting the strands into granules and seasoning the granules at a temperature below the effective point of the solvent.

COMBUSTIBLE RESINS. T. Urganaki. U. S. 2,419,043, Apr. 15. The process for the production of combustible synthetic resins which comprises reacting a methylol nitro alkaryl or aryl compound with ammonia and formaldehyde at a temperature between 15 and 150° C.

VINYL FURANE COPOLYMERS. A. M. Clifford (to Wingfoot Corp.). U. S. 2,419,057, Apr. 15. A copolymer of vinyl furane and a branched chain unsaturated aliphatic carboxylic acid, the double bond in said branched chain being conjugated with oxygen contained in carboxyl group.

RUBBERLIKE DISPERSIONS. J. Edwardes (to C. L. Brackett). U. S. 2,419,060, Apr. 15. The method of preparing an aqueous dispersion of rubberlike material comprising admixing with a flocculate of an inorganic polysulfide and an olefin dihalide an alkaline solution of a protective colloid and a wetting agent, adding a reagent for swelling the polysulfide, adding water, subjecting to vigorous agitation removing swelling agent.

COPOLYMERS. F. W. Cox (to Wingfoot Corp.). U. S. 2,419,122, Apr. 15. Copolymers of vinyl chloride interpolymerized with a trialkyl ester of aconitic acid.

CURED VINYL POLYMER. T. H. Rogers, Jr., and R. D. Vickers (to Wingfoot Corp.). U. S. 2,419,166, Apr. 15. A thermoset copolymer of a monomeric mixture of vinylidene chloride and vinyl chloride is obtained by incorporating a guanidine, having at least two aryl substituents and heating to a temperature between 240 and 360° F. until a gain in tensile strength of at least 50 percent is obtained.

ROSIN POLYMERS. C. A. Braidwood and A. G. Hovey (to Reichhold Chemicals, Inc.). U. S. 2,419,185, Apr. 15. Rosin is polymerized through the catalytic action of fluosulfonic acid.

ABRASIVE SHEET. A. C. Barwell (to Hercules Powder Co.). U. S. 2,419,194, Apr. 22. An abrasive product comprising a backing of a cellulosic sheet material, a coating comprising a proteinaceous adhesive and the ethylene glycol ester of a pine wood resin having a petroleum hydrocarbon insolubility, and abrasive grains embedded in the coating.

INTERPOLYMERS. G. F. D'Alelio (to General Electric Co.). U. S. 2,419,202, Apr. 22. The process comprising the polymerization of an aqueous emulsion of a monomer mixture of styrene, ethyl acrylate and 5 to 10 percent of a butadiene-1,3 derivative.

COATED PAPER. H. C. Fisher (to Consolidated Water Power and Paper Co.). U. S. 2,419,207, Apr. 22. Paper is treated by applying an aqueous polyvinyl alcohol solution to the surface, passing through rolls to smooth the coating, and, while retaining the surface in the dampened condition, imprinting a mineral coating in an aqueous vehicle and finally drying and calendering.

COPOLYMERS. W. O. Kenyon and J. H. Van Campen (to Eastman Kodak Co.). U. S. 2,418,221, Apr. 22. A copolymer of 2-chloroallyl acetate and acrylic acid.

SEALING COMPOSITION (to American Can Co.). U. S. 2,419,224, Apr. 22. A sealing composition for the lining of the joints of food containers comprising a homogeneous mixture of ethyl cellulose, a vegetable oil, a hydrogenated rosin and a finely divided inert filler, said solid components being dispersed to a suitable viscosity in a low-boiling solvent.

WRINKLE VARNISH. W. A. Waldie (to New Wrinkle, Inc.). U. S. 2,419,238, Apr. 22. A wrinkle varnish base is prepared by heating unblown dehydrated castor oil and an oil-soluble modified phenol-formaldehyde resin to 580° F., discontinuing heating, adding more castor oil and heating to 400° F., and then holding the temperature between 375 and 400° F. while blowing air through the mixture until the desired viscosity is obtained.

COATING DEVICE. R. K. Goodlatte (to Producing Engineering Corp.). U. S. 2,419,260, Apr. 22. A machine for coating and impregnating articles.

POLYAMIDES. R. W. Moncrieff, C. W. Sammona, and E. W. Wheatley (to Celanese Corp. of America). U. S. 2,419,277, Apr. 22. Polyamide compositions suitable for conversion into films, filaments and other shapes are prepared by precipitating in finely divided condition from solution by means of a non-solvent medium containing an agent which, in association with the polyamide, yields a composition of low melting point, and leaving the agent in contact with the polyamide for a period of time sufficient to lower its melting point.

POLYVINYL ALCOHOL. M. V. Noble (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,419,281, Apr. 22. A self-sustaining film of polyvinyl alcohol containing from 0.1 to 10 percent of cetyl dimethyl benzyl ammonium chloride.

CORDAGE. J. H. Watson, H. E. Anderson, and E. R. Angel. U. S. 2,419,328, Apr. 22. Impregnated cordage is produced by forming cordage from a plurality of strands of paper impregnated with constituents of a thermosetting synthetic resin, impregnating the cordage with a partially condensed thermosetting synthetic resin and drawing the impregnated cordage through a die while simultaneously further condensing the resin.

POLYMERIZATION CATALYSTS. V. L. Folt and F. W. Shaver (to B. F. Goodrich Co.). U. S. 2,419,347, Apr. 22. Vinyl chloride is polymerized in aqueous emulsion in the presence of a bis (ortho-alkoxybenzoyl) peroxide containing no substituent groups except alkoxy groups.

SPLINT. S. P. Lovell (to Lovell Chemical Co.). U. S. 2,419,358, Apr. 22. A splint comprising an inner flexible cushion, an outer shell comprising laminations of thin, flexible, pressure sensitive strip material such as cellulose acetate, cellulose acetate butyrate, Celluloid, ethyl cellulose, polyethylene, polytetrafluorethylene, polyvinylidine chloride, polystyrene or regenerated cellulose.

Plastics Stock Molds*

SHEET ONE HUNDRED FIFTY-THREE

Attractiveness of color, transparency and molded design enhance these ordinary household items. The curtain tiebacks and the shower curtain hooks find their way into almost every home. The napkin holder is a convenient item and handsome enough for any table. The swigglesticks and the coasters accompany the serving of mixed drinks.

1768. This window drape and curtain tieback can be turned out in a variety of transparent and translucent colors to harmonize with any room color scheme.

1769. Drink mixers may also be turned out in a variety of colors. This enables a host or hostess to keep the glasses of guests separated quite easily. One end is designed as spearer; the other as fork.

1770. This window drape and curtain tieback is similar to No. 1768 with the exception that it is made from a clear thermoplastic material.

1771. Festoon holders with graceful floral design come in transparent thermoplastic material.

1772. Shower curtain hooks made to fit the standard size shower curtain rod are of clear thermoplastic. Hooks to hold the curtains are turned inward.

1773. These shower curtain hooks are molded with hooks for curtain turning outward. They are in opaque colors.

1774. One-piece transparent clothespins are designed to fit standard outdoor and indoor lines, wire or small lingerie cords.

1775. Coaster is fabricated of acrylic. The floral design in the center and the two circles are carved on the underside of the coaster and enhance the over-all appearance of the finished piece.

1776. Molded napkin holders with flower motif find ready acceptance in the breakfast room or as a handy container of napkins for meals which are served outdoors.

1777. Figure of swan on these window drape and curtain tiebacks gives air of distinction. They may be produced in clear thermoplastic material.

The names and addresses of the manufacturers who make these stock molds are listed on page 158.

* Reg. U. S. Patent Office.

"I just saw a Fiberglas snowstorm"*

He has seen more than that. He's seen an important step in a new, economical, high-speed method of mass producing plastics products, *reinforced with Fiberglas fibers*. . . The "snowstorm", blown fiber, preform process converts short strands of Fiberglas into a preform having the approximate shape and dimensions of the finished part. The preform is then placed into a heated mold and, with the addition of resin and application of pressure, is converted into a finished part. This process permits the production of "deep-drawn" shapes without drawing . . . Investigate this production process. It may solve some of your problems. Find out about the various forms in which Fiberglas is furnished for plastics reinforcement —Fiberglas has a combination of desirable characteristics found in no other material.

WRITE FOR SAMPLES of Fiberglas "snowstorm" fibers, T-36 mat, or ask for a copy of the new booklet describing all Fiberglas reinforcing materials and illustrating the new quantity production methods. Owens-Corning Fiberglas Corporation, Dept. 876, Toledo 1, Ohio. Branches in principal cities.

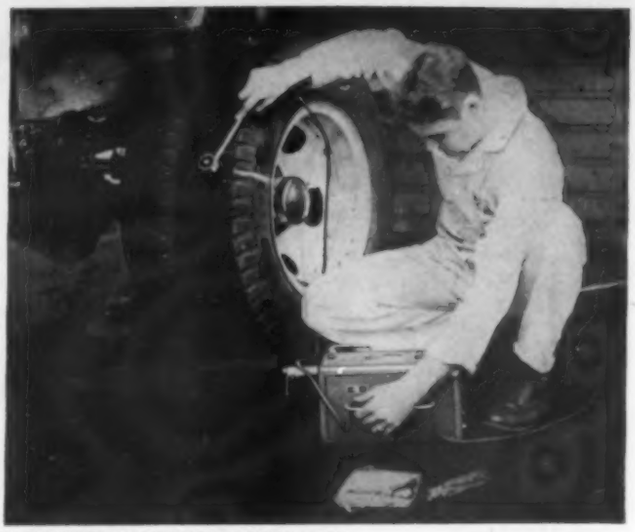
In Canada: Fiberglas Canada Ltd.

OWENS-CORNING

FIBERGLAS

FIBERS • MATS • CLOTHS

*FIBERGLAS is the trade mark (Reg. U. S. Pat. Off.) of a variety of products made of or with glass fibers by Owens-Corning Fiberglas Corporation.



PHOTOS, COURTESY DUREZ PLASTICS & CHEMICALS, INC.

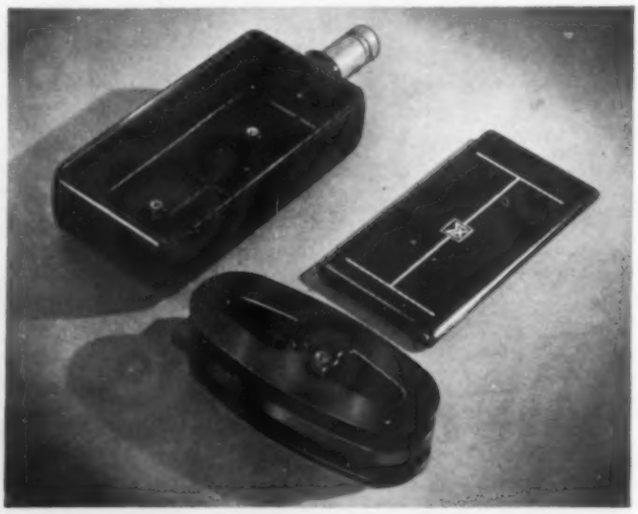
The molded phenolic inspector head is moved over surface of a flat tire until meter registers metal particles

Phenolic tire inspector

THE EXCELLENT dielectric properties of Durez phenolic caused its selection for use in the locating head of this electronic tire inspector. The instrument, put out by Magnaflux Corp., 5900 Northwest Highway, Chicago 31, Ill., is used for detecting and locating metal particles imbedded in tire treads.

The head of the instrument consists of a wire coil wound on a Durez phenolic bobbin and housed in a high-impact Durez phenolic case. Both bobbin and case are molded by Trans-Matic Plastics Co., 5501 W. Montrose Ave., Chicago 41, Ill. Tire inspector is usually operated by slowly revolving tire over the locating head and marking with chalk on the side wall the position of metal particles as indicated by the meter.

The head of the instrument consists of wire coil wound on molded phenolic bobbin and housed in phenolic case



Matched right through Plexiglas

A perfect match for any color . . . a perfect *way* of matching! Here's how Martin-Senour's Nu-Hue Color System works:

Discs of the 1000 paint colors available are placed on 9 crystal-clear PLEXIGLAS sheets (fabricated by Steiner Mfg. Co., Long Island City, N. Y.). Just place a color sample behind the transparent sheet, and match it exactly to the right paint color. No color distortion with PLEXIGLAS.

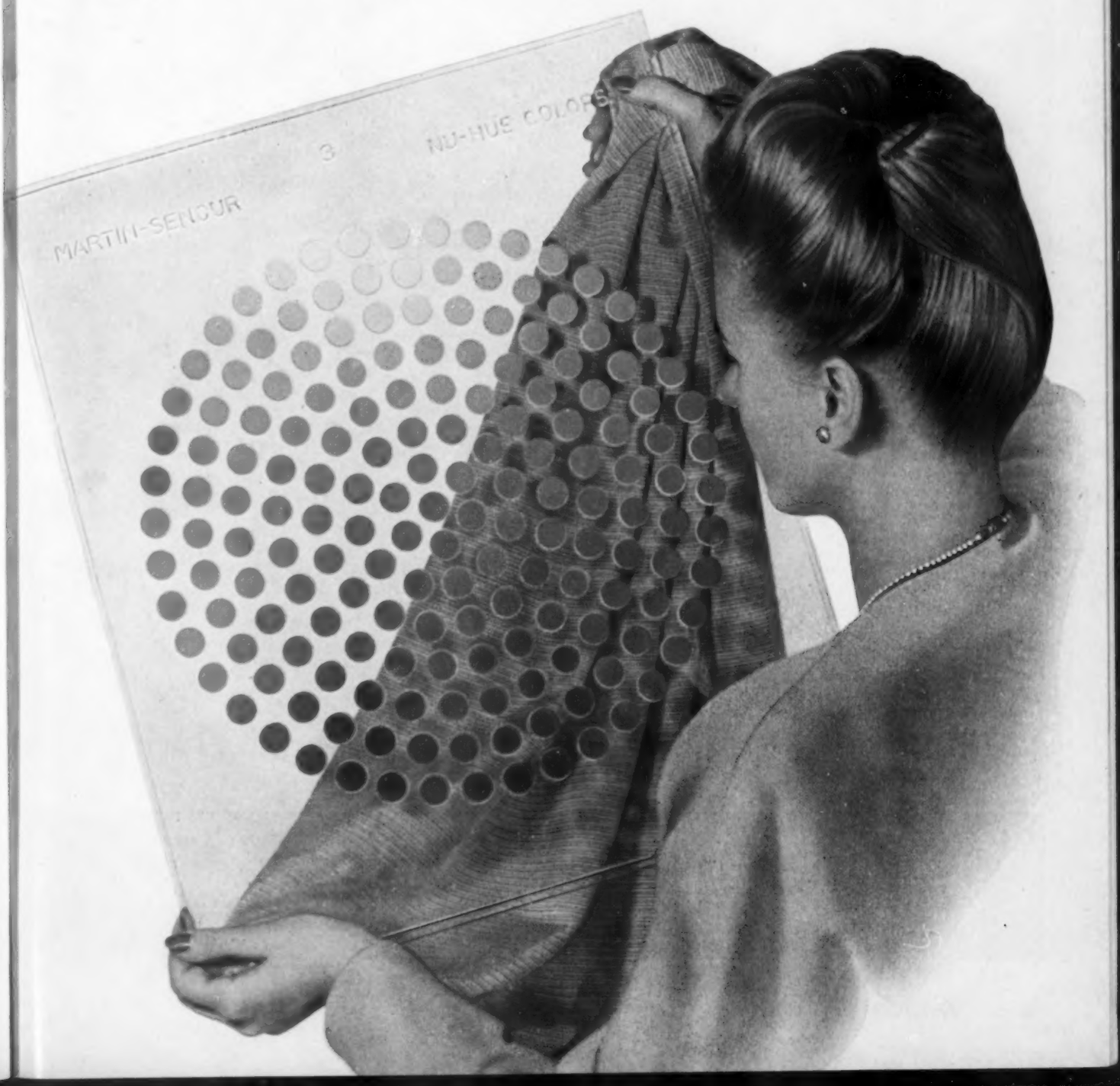
The lightweight acrylic plastic sheets are easy to handle . . . pleasing to the touch. Strong, too . . . little risk of breaking or chipping. Easily cleaned with soap and water.

Don't these time-tested PLEXIGLAS features suggest new ideas for *your* business? Write or call our nearest office: Philadelphia, Detroit, Los Angeles, Chicago, New York. Canadian Distributor: Hobbs Glass, Ltd., London, Ontario.

Only Rohm & Haas makes PLEXIGLAS *Acrylic Plastic Sheets and Molding Powders.* PLEXIGLAS *is a trade-mark Reg. U. S. Pat. Off.*

ROHM & HAAS COMPANY

Washington Square, Philadelphia 5, Pa.



Saran BY NATIONAL

WEBBING WOVEN OF
CREATES A NEW CONCEPT IN MODERN FURNITURE

The versatility of SARAN monofilaments is demonstrated again in the weaving of narrow fabrics that lend themselves admirably to the creation of modern furniture. In interesting textures and striking colors, these new fabrics give the designer free reign in displaying his ingenuity. SARAN woven fabrics are safe from dirt, alcohol, acids. They won't snag, stretch or scuff. Their remarkable abrasion-resistance endows them with magical durability. These fabrics are bringing beauty and livability to the home ... an inviting atmosphere to hotels, clubs and restaurants.

Now, SARAN monofilaments are available as fine as .005"—offering a still wider range of weaving possibilities.

Let us tell you how SARAN monofilament can build new sales opportunities for your product.

SARAN BY NATIONAL denotes monofilament, rattan and tape manufactured by The National Plastic Products Company from Saran, a vinylidene chloride copolymer made by The Dow Chemical Company and supplied to mills, weavers and other fabricators for specific end uses.

TRADE MARK REG. U. S. PAT. OFF.

The NATIONAL Plastic Products Company

ODENTON • MARYLAND

NEW YORK: EMPIRE STATE BUILDING • LOS ANGELES: BANKERS BUILDING

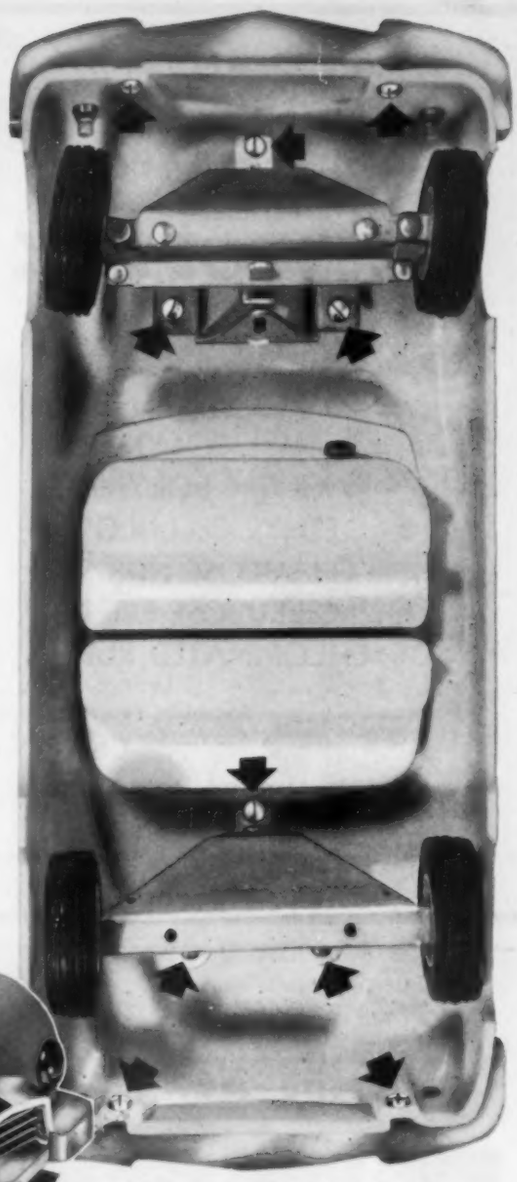
Common Sense Assembly Engineering

STREAMLINES

a tricky fastening job- saves extra cost of inserts

● Steer-o-toys, Inc., designed this plastic toy automobile to be the smoothest job on the playroom highways — with obvious success. Determined to make it an equally smart job of assembly, the manufacturer followed the advice of the molder, Elmer E. Mills Corp., and chose P-K Self-tapping Screws.

That decision will pay dividends as long as this toy is made . . . by saving the extra molding time and expense inserts would have required . . . by avoiding the extra cost of needless tapping. With the P-K "short cut" method, one operation makes a secure, dependable fastening — driving the screw in a plain, untapped hole.



Steer-o-toy
Molded by
Elmer E. Mills Corp., Chicago
for
Steer-o-toys, Inc., Chicago

P-K Type "Z" Self-tapping Screws fasten both front and rear wheel units to the cellulose acetate body, and also secure the front and rear bumpers. A P-K Type "U" Drive Screw fastens the steering wheel on the steering column. Complete assembly has ample sturdiness to withstand abuse by careless youngsters.

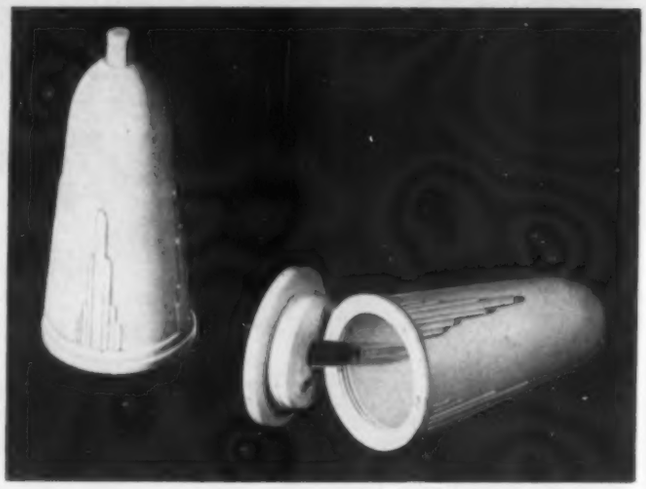
● Why not find out if you can *start* operations several steps closer to the finished assembly by using P-K Self-tapping Screws. It's plain common sense to begin making savings you've been missing — often up to 50% — in work-hours now wasted by needless tapping, bolting, riveting, inserts in plastics. Often your product can be simplified in design, and made stronger.

A P-K Assembly Engineer will call at your request to examine your assembly and advise you. Or, mail assembly details for recommendations. Parker-Kalon Corp., 200 Varick St., New York 14, N. Y.

Sold Only Through Accredited Distributors

PARKER-KALON **P-K** **SELF-TAPPING SCREWS**

A FASTENING FOR EVERY METAL AND PLASTIC ASSEMBLY



This dispenser is operated by a valve stem of extruded butyrate which releases salt or pepper through urea base

Urea saltcellars

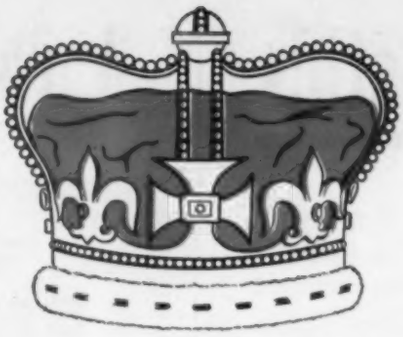
GOOD HEAT resistance, dimensional stability and durability insured by a 1/8-in. wall thickness are among the advantages imparted to the new Sonnette salt and pepper dispensers by use of urea-formaldehyde. The design of the set is also said to insure instrument-like precision and dry seasoning in the dampest weather.

A product of Sonnette Co., the shaker consists of housing, bottom cap, button, valve stem, valve and springs. The housing is compression molded of Plaskon by the Plastics Div., General American Transportation Co., 135 S. La Salle St., Chicago, Ill. Unlike the thermoplastic housings in older dispensers of the same type, which were two-piece jobs, the present housing is molded in one piece with the exception of the bottom cap. This cap, also of Plaskon, is molded in a multi-cavity compression mold.

The button is made on an automatic screw machine from rod stock extruded of white (for salt) or black (for pepper) Tenite II. This material was found to have suitable flexibility and machinability and extrudes to close tolerances.

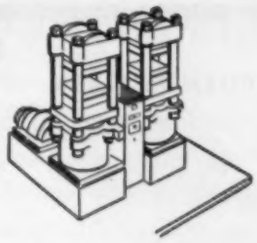
The button is glued on the valve assembly stem which is cut from a transparent extruded Tenite II rod to a tolerance of 0.002 inch. The springs used to hold the valve are of stainless steel while the valves are molded of a special pure food rubber. The shape of the valve and the design of the valve seat cause release of salt or pepper in a circular pattern over a considerable area —the extent depending on the height and angle at which the dispenser is held, and manual pressure.

The set is available in classic, streamline or modernistic design and in black, white, yellow, red, blue, ivory, orange or green.



COMPACT

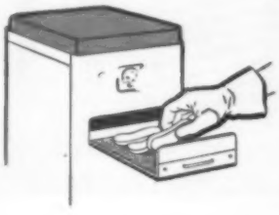
Occupies only 3 square feet of floor space. You wheel this THERMEX Red Head into your present press layout, plug into standard power line, and start production.



VERSATILE

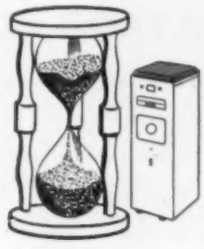
Can be used to keep several presses busy. Dual timers permit heating of two different charges in any sequence. Operator simply flips selector switch for any desired time.

Model 1R1A



SIMPLE

Anyone can operate it. Preforms are put into the famous THERMEX Drawer. High frequency power starts when drawer is closed. Automatic timer cuts power when preforms are ready.



DEPENDABLE

Rugged construction and sound electronic design assure years of service under severe operating conditions. Automatic devices offer every possible protection against equipment failure.

Queen of the Thermex Red Heads

Aces in high frequency heating for plastics

THERMEX pioneered in the development of high frequency equipment for preheating plastic materials. Starting with the application in its infancy, THERMEX electronic engineers have learned through outstanding field experience.

This new THERMEX Red Head embodies all that has been learned.

Although extraordinarily compact, it takes preforms weighing up to ¾ lb. and, in a minute or less, uniformly heats them to just the right degree for free flow in the mold. Closing pressures are reduced as much as 80%. Pin breakage is minimized. Rejects are reduced. Production is upped an average 30%—in finished pieces of uniform density, higher gloss, greater strength.

You get *continued* peak performance with this new THERMEX unit. Features too numerous to mention here, having to do with its internal "works," assure sustained, trouble-free, foolproof, full-time operation. For complete technical details write for THERMEX BULLETIN 1R1A. The Girdler Corporation, Thermex Division, Louisville 1, Kentucky.

District Offices: 150 Broadway, New York 7, N. Y.
228 N. LaSalle St., Chicago 1, Ill. • 5614 Telephone Rd., Houston 12, Tex.

Thermex RED HEADS

THERMEX and RED HEAD—T. M. Reg. U. S. Pat. Off.

THE FIRST INDUSTRIAL HIGH FREQUENCY DIELECTRIC HEATING EQUIPMENT

A compact portable

Radio has phenolic front panel, polystyrene back, acrylic dial, vinyl handle, cellulose acetate butyrate base

THE SMALLER radios become, the more plastics are called upon to give beauty, utility and freedom of design that spell increased sales in this very competitive field.

One compact and very attractive portable set to reach the market is the new Solitaire designed by H. M. Rundle for RCA Victor Div., Radio Corp. of America, Camden, N. J. Measuring only 6 $^{3}/_{8}$ by 4 $^{5}/_{8}$ by 4 $^{1}/_{4}$ in., this diminutive, battery-powered "personal" is luxuriously styled in 24-karat gold electroplated metal, combined with a black and white marble-like Catalin front panel and matching injection molded polystyrene back plates.

Other exterior plastic components include the Lucite tuning dial, consisting of two parts assembled with a notched metal rim, and the flexible Vinylite resin carrying handle which is fabricated by RCA from an extruded section. A dovetailed strip of transfer molded Tenite II is inserted in the bottom of the radio to keep the metal chassis from forming a full loop. This feature prevents interference for the built-in antenna. Cellulose acetate butyrate was selected because of its ability to withstand high stress or strain.

The polystyrene back, comprising a grooved frame and removable slide, is molded on either a 4-oz. or 9-oz. press by Santay Corp., 351 N. Crawford Ave., Chicago

using five plastics

24, Ill., which uses a 2-cavity mold for this purpose. The frame which is deeply grooved where it joins metal part of the case, is cored at each corner for assembly screws and is also grooved on three sides of its inner surface where it engages the slide. The latter grooves, which constitute undercuts, are produced by a side arrangement in the core of the mold.

The slide, whose side grooves fit the undercuts on the frame, is X-ribbed for rigidity and has three small projections which lock into corresponding notches in the frame, insuring a tight fit. Fingertip pressure removes the back panel for battery replacement.

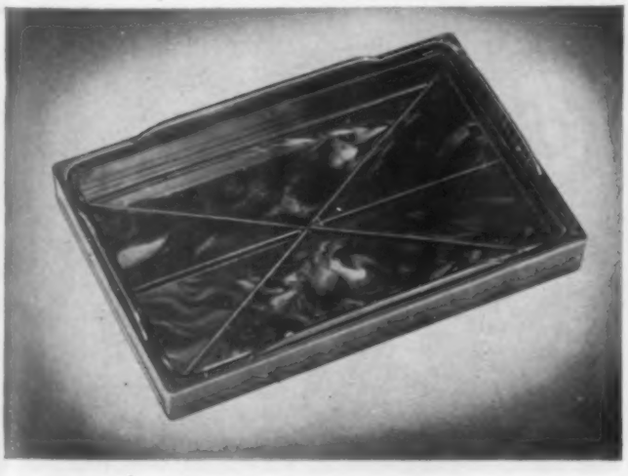
Two-part dial mirror-finished

Molded of clear acrylic by Santay Corp., the dial consists of two parts—a shallow, bowl-shaped member terminating in a slotted shaft which actuates the tuning mechanism and a circular crystal into the back of which "RCA Victor" and numbers bracketing the standard broadcast band are molded. The larger dial piece is first given a mirror finish by applications of silver nitrate to the back, after which gold dye is sprayed on the concave surface. The circular dimple in the back of the crystal is also mirror-finished. Then the two parts are locked into a single unit with the gold-plated metal rim.

The handle of the radio is cut from a section of black flexible vinyl extruded by Sandee Mfg. Co., 5050 Foster Ave., Chicago 24, Ill. Having no joints or seams it is very serviceable as well as pleasant to the touch. It is secured to the frame by means of clips which pass through the integrally formed loops at each end.

The dealer display unit developed for this new set includes a four-sided 9½-in. Plexiglas dome mounted on a maroon wooden base. The receiver rests on a mat of white spun-glass fabric beneath the transparent dome.

The polystyrene back, shown here, comes in two parts—a frame and removable slide which is X-ribbed for rigidity



Folding toothbrush

A FLICK of the finger and this compact unit made of Tenite I and II reveals a folding toothbrush and a container of tooth powder—an ideal kit for vacationers or salesmen on the road. Measuring $2^1/_2$ by $1^3/_4$ by $^1/_2$ in., this Totebrush can easily be carried in a pocket or purse and is available in red, blue, green or ivory.

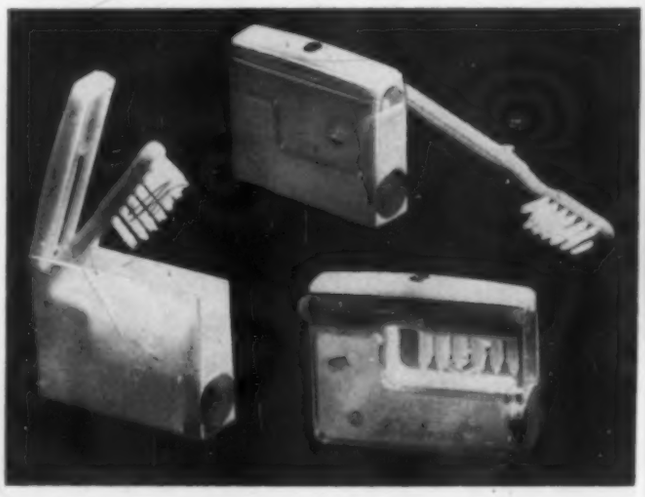
The cellulose acetate container section is produced in two parts by Gem Products Co., 2411 Clybourn Ave., Chicago, Ill., in a 12-cavity mold. One part is flat; the other is molded with three sides, an opening for the tooth powder and a partition which separates the powder and brush chambers. This method of molding eliminates the need for a complicated mold with side actions. The two container parts are later sealed together with acetone. Two diamond-shape openings in the brush chamber allow free circulation of air. The powder chamber opening has a rather thick neck to accommodate a knurled metal cap.

The folding brush handle, molded of cellulose acetate butyrate, consists of three sections—the two hinged handle parts which are later joined by a metal pin, and a sliding part which actuates a metal bar that slides in a groove in the handle, locking it into a rigid unit for use.

Nylon tufting of the brushes is done by Owens Brush Co., Thomas and Wellington Streets, Toledo, Ohio. Owens drills the head of the brushes, inserts and locks the bristles. All other assemblying is done by the Gem Products Co.

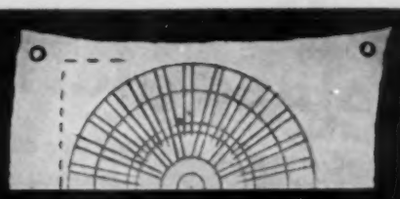
The brush, when folded, snaps into the open side of the container and closes the whole affair into a compact unit. Four tiny dimples on the sides of the brush handle match four bumps on the inside surface of the brush chamber, providing a firm closing action.

A good idea of the container can be obtained from these angle shots. Toothbrush locks into rigid unit for use



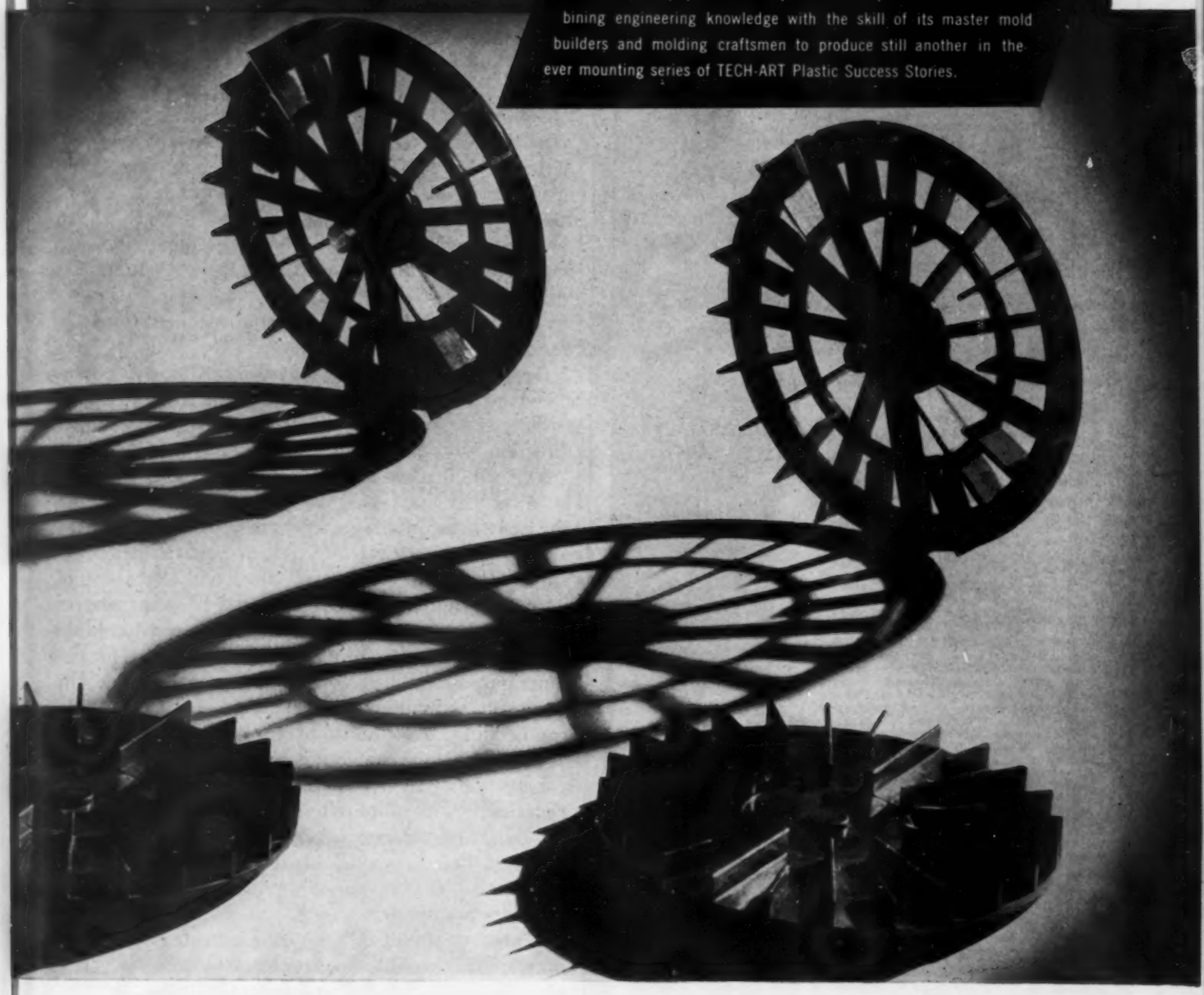
REVOLUTION-ARY *Ideas . . . Molded in* PLASTICS

Revolutionary in their functional use as well as in their concept have been many of the products molded by TECH-ART. Never in today's practice need plastics be considered a media for products of static use only. Instead, more and more products having dynamic functions are being engineered and produced under the trained minds and skilled hands of TECH-ART's engineers and craftsmen. TECH-ART's vast facilities include every type of compression and compression-transfer molding equipment, as well as a large battery of injection molding units. Add to this TECH-ART's broad experience in product engineering and development and you have the best assurance that your product, too, in the hands of TECH-ART, will become another Plastic Success Story.



Another Plastic Success Story

The Permutit Company brought these impulse and impeller wheels to TECH-ART to mold. To revolve at speeds as high as 3200 r.p.m., their thin fins had to be extremely strong. Precision molding and the use of materials that would not warp was essential if the delicate balance of rotary action was to be maintained. The fact that TECH-ART has delivered many thousands of these finely balanced parts to this leading manufacturer of chemical measuring instruments and equipment is a splendid example of the art of combining engineering knowledge with the skill of its master mold builders and molding craftsmen to produce still another in the ever mounting series of TECH-ART Plastic Success Stories.



TECH-ART
PLASTICS COMPANY

36th Ave. and 41st Street • LONG ISLAND CITY, N. Y. • Tel. ASteria 8-6050-1
SUCCESSORS TO BOONTON RUBBER MANUFACTURING COMPANY

Variations in acrylic

THE DECORATIVE possibilities of Plexiglas are substantially increased by two new variations of the acrylic—corrugated and patterned. Stepping into spots where it is impractical to use a smooth surfaced and completely transparent sheet, they will probably find application in decorative walls, doors, partitions and house furnishings.

Like the basic material, these developments possess certain inherent properties such as light weight, ease of machining, dimensional stability, good electrical insulating characteristics, resistance to chemicals, breakage and weather. The two effects can be produced in transparent, translucent and opaque colors and may be combined, if desired, to produce a colored corrugated sheet with patterned surface.

Corrugated form

In the corrugated form, the usual flat appearance of the acrylic sheet is altered by giving it various degrees of corrugations. It is produced by forming in a corrugated mold, after the plastic sheet has been cast. It may be strip-formed parallel to the corrugations. Its longitudinal flexibility, of course, permits it to be mounted in curved sections without forming. Transversely (against the direction of the corrugations) it has great rigidity.

Because of the way in which it is formed, corrugated acrylic is particularly advantageous in applications calling for a material that is flexible in one direction and rigid in another.

The combination of these two characteristics results in a very remarkable load-bearing ability and, at the same time, in a high degree of resistance to breakage. In architectural screens and partitions, for example, the material is used effectively. Because of its light weight and strength, it can be suspended to provide false ceilings below lighting fixtures, to obtain soft indirect lighting, or installed as a false wall for the same purpose. When striking effects are in order, the frequency, amplitude and shape of the corrugations can be varied in a multitude of ways.

The corrugated material is available in two types of corrugation: 1 by $^3/_8$ in. (1 in. between peaks of corrugation, $^3/_8$-in. amplitude of corrugation), and 2 by $^1/_2$ inch. Sheet sizes range up to 64 by 79 inches. The fact that it is available in a choice of degrees of corrugation, that it can be obtained in quite a variety of colors and in large sheets, and because it combines the structural advantages of corrugated glass, the acrylic may soon become a competitor of glass. It is also competitive in price with corrugated glass.

Patterned acrylic

In the patterned material, a number of surface designs are applied during the manufacturing process

to the normally flat, smooth Plexiglas. This acrylic is cast, the patterns being the reverse of those on the surface or surfaces of the material between which the sheets are cast. Inasmuch as these patterns are achieved during the casting operation, the material may subsequently be formed and machined by standard fabricating techniques, to almost any desired shape.

The patterned material is recommended for use in any application where the general properties of acrylic are of advantage, but a high degree of transparency is either not necessary or not desired, or where a patterned surface will give increased functional or decorative values. Present applications include architectural partitions, desk sets, vending machines. These applications show little effect from abrasion and therefore require a minimum of maintenance to preserve the original beauty of the acrylic.

Patterned Plexiglas is being produced, to date, in 11 patterns—crinkled surfaces, cross hatching, broad and narrow flutings, ribbed, pebbled, dotted, frosted finishes and combinations of basic patterns—in thicknesses of 0.125 and 0.250 inch. Sheet sizes are: 36 by 48 in. and 40 by 50 inches.

Plastics Products Addresses

(mentioned on pages 102 through 105)

Anfinsen Plastic Molding, Aurora, Ill.
Arnold Brilhart, Ltd., Old Country Rd., Mineola, N. Y.
Atomette Co., Inc., 40 E. 21st St., New York City.
Barnes & Reinecke, Inc., 230 E. Ohio, Chicago 11, Ohio.
Cambridge Molded Plastics Co., Cambridge, Ohio
Continental Plastics Corp., 308 W. Erie St., Chicago, Ill.
Dilley Mfg. Co., Ansel Rd. at Edmunds Ave., Cleveland 6, Ohio.
Dimco Plastics, Inc., 207 E. Sixth St., Dayton 2, Ohio.
Fabri-Form Co., 184 Second St., Byesville, Ohio.
Faries Mfg. Co., 1037 E. Grand Ave., Decatur, Ill.
Fuller Brush Co., Hartford, Conn.
Gits Molding Corp., 4600 Huron St., Chicago 44, Ill.
Grigoleit Co., North & Short streets, Decatur 80, Ill.
Jackson Mfg. Corp., 2608 Milwaukee Ave., Chicago, Ill.
Kent Plastic Corp., 1528 N. Fulton Ave., Evansville 10, Ind.
Kuhlman Plastics Co., Kansas City, Mo.
Love-Bird Products Co., Aurora, Ill.
Elmer E. Mills Corp., 153 W. Huron St., Chicago 10, Ill.
Northwestern Plastics Co., 2535 W. Washington Blvd., Chicago, Ill.
Plastic Engineering, Inc., 8506 Lake Ave., Cleveland 2, Ohio.
Porto-Sight Co., 1830 Grand Ave., Kansas City, Mo.
Raefleman's, 152 Grandby St., Norfolk, Va.
Sanitary Aids Co., P. O. Lock Drawer 508, St. Louis, Mo.
Shoe Form Co., Inc., Auburn, N. Y.
Thomas A. Steeds Co., 1836 Euclid Ave., Cleveland 15, Ohio.
World Publishing Co., 2231 W. 110th St., Cleveland 2, Ohio.

Stock Mold Addresses

(mentioned on page 144)

1768, 70–73, 76, 77. Emeloid Mfg. Co., 946 Lake St., Newark, N. J.
1769 Mack Molding Co., Wayne, N. J.
1774 Columbus Plastic Products, Inc., 519 Dublin St., Columbus, Ohio.
1775 Cass Plasticrafters, 250 Brush St., Detroit 26, Mich.

Consumption of

THE MOST interesting figure in the Census Department's plastic consumption figures for June is the record breaking output of over 17,000,000 lb. of phenolic molding compounds. Phenolic laminating and adhesive resins declined after a steady climb throughout the year. Cellulose acetate and mixed ester plastics continued their drop but not as precipitously as in the preceding month. Consumption of acetate sheeting remained about the same as in previous

PLASTICS AND SYNTHETIC RESIN CONSUMPTION
From Statistics Compiled by Bureau of

Materials
Cellulose acetate and mixed ester plastics[a]
Sheets
Continuous (under 0.003 gage)
Continuous (0.003 gage and upward)
All other sheets, rods and tubes
Molding and extrusion materials
Total
Nitrocellulose plastics[b]
Sheets
Rods and tubes
Total
Other cellulose plastics[a,b]
Phenolic and other tar acid resins
Laminating (dry basis)
Adhesives (dry basis)
Molding materials[a]
All other, including casting (dry basis)[d,f]
Total
Urea and melamine resins
Adhesives (dry basis)
Textile and paper treating (dry basis)
All other, including laminating (dry basis)[d,f]
Total
Polystyrene[d,g]
Vinyl resins
Sheeting and film, including safety glass sheeting[a]
Textile and paper coating resins (resin content)
Molding and extrusion materials (resin content)
All other, including adhesives (resin content)[d]
Total
Miscellaneous
Molding materials[a,h]
All other (dry basis)[d,i]
Total
Grand Total

[a] Includes fillers, plasticizers and extenders. [b] Includes methyl and ethyl cellulose and related plastics. [c] Data cannot be published without disclosing operation of individual establishments. [d] Excludes data for protective coating resins. [e] Includes operations of one company reporting for the first time in June; however, this does not appreciably affect the comparability with previ-

plastics materials

months—probably an indication that increased quantities are going into the packaging market. Polystyrene suffered the severest drop of any month this year, reflecting the slump in thermoplastics. Urea and melamine molding powder figures are not available separately but are included in miscellaneous. Vinyl resins continued downward with most marked decline in molding and extrusion materials but the vinyl statistics are too involved for accurate interpretation.

IN POUNDS FOR JAN. THROUGH JUNE, 1947
Census, Industry Division, Chemical Unit

May 1947	*June 1947*	*Totals for first 6 months—1947*
lb.	*lb.*	*lb.*
663,256	664,506	4,252,080
668,547	662,779	3,611,743
357,679	354,973	2,281,080
4,316,753	3,735,297	34,608,578
6,006,235	5,417,555	44,753,481
777,782	731,502	5,189,131
274,299	199,313	2,267,368
1,052,081	930,815	7,456,499
[c]	[c]	1,685,554[h]
4,015,364	3,696,974	21,104,716
1,944,834	1,587,664	10,414,576
16,428,733[f]	17,294,181	91,911,457
5,021,444[f]	5,187,684[g]	35,224,666
27,410,375[f]	27,766,503	158,655,415
3,876,904	4,235,157	24,256,451
1,556,831	794,438	8,475,689
668,464	615,012	4,364,538
6,102,199	5,644,607	37,114,678
6,854,145	5,954,635	40,861,608
4,430,884	3,914,699	31,507,349
1,431,879	1,083,553	7,211,582
5,777,376	4,937,022	36,672,904
1,485,663	1,610,528	13,549,402
13,125,802	11,545,802	88,941,237
4,238,051[f]	3,915,722	30,081,437
2,196,509[f]	2,356,722	14,909,981
6,434,560[f]	6,272,444	44,991,418
66,985,397[f]	63,532,361	426,145,444

ous months. [f] Excludes urea and melamine molding materials; see footnote [h]. [g] Dry basis, including necessary coloring material. [h] Includes data for urea and melamine, acrylic acid and miscellaneous molding materials. [i] Includes data for petroleum resins, acrylic acid ester resins, mixtures and miscellaneous synthetic materials. [r] Revised. [k] Total, January through April only.

PHOTO, COURTESY WEYERHAEUSER TIMBER CO.

One of several new raw materials which are being processed from bark for use in the compounding of plastics

Fillers from bark

A NEW source of raw materials valuable in plastics compounding, as well as in other fields, is being tapped by a commercial-scale bark processing plant recently put in operation by the Weyerhaeuser Timber Co. at Longview, Wash.

This plant marks a significant step toward complete utilization of forest resources, for until now bark, which represents about 12 percent of a saw log, has been considered of little value except for fuel. For several years pilot plants have been producing the bark components—cork-like flakes, stiff fibers and a tissue powder—for experimental purposes. These products and two combinations of them are being marketed under the general tradename, Silvacon.

Three of the five Silvacon products, representing about 70 percent of the plant's output, have proved valuable in plastics manufacture. They are No. 508, No. 472 and No. 412. Total daily maximum production of these three is estimated at 75,000 lb. or $1^1/_2$ carloads. It is said that quality molding compounds can be processed from Silvacons less expensively than from the standard fillers such as walnut shell or woodflour. All three are tasteless and odorless.

For good impact strength

Among the proved applications of No. 508 is its use as an ingredient in impact grades of thermosetting compounds and in cold molded plastics. One advantage is that it gives increased impact strength, with little increase in the apparent bulk density as compared with cotton flock. It is also being used experimentally as a thermoplastic reinforcing agent.

It is composed almost entirely of bark's spindle-

Vibrin*

THERMO-SETTING POLYESTER RESINS

For Low Pressure Laminating, Impregnating, Casting or Molding

Standard Vibrin Types Now Available

General Purpose. A versatile, low-cost resin of good color and transparency, low viscosity, desirable toughness and medium hardness.

Hard and Heat Resistant. This hard resin gives superior solvent, chemical, abrasion and temperature resistance.

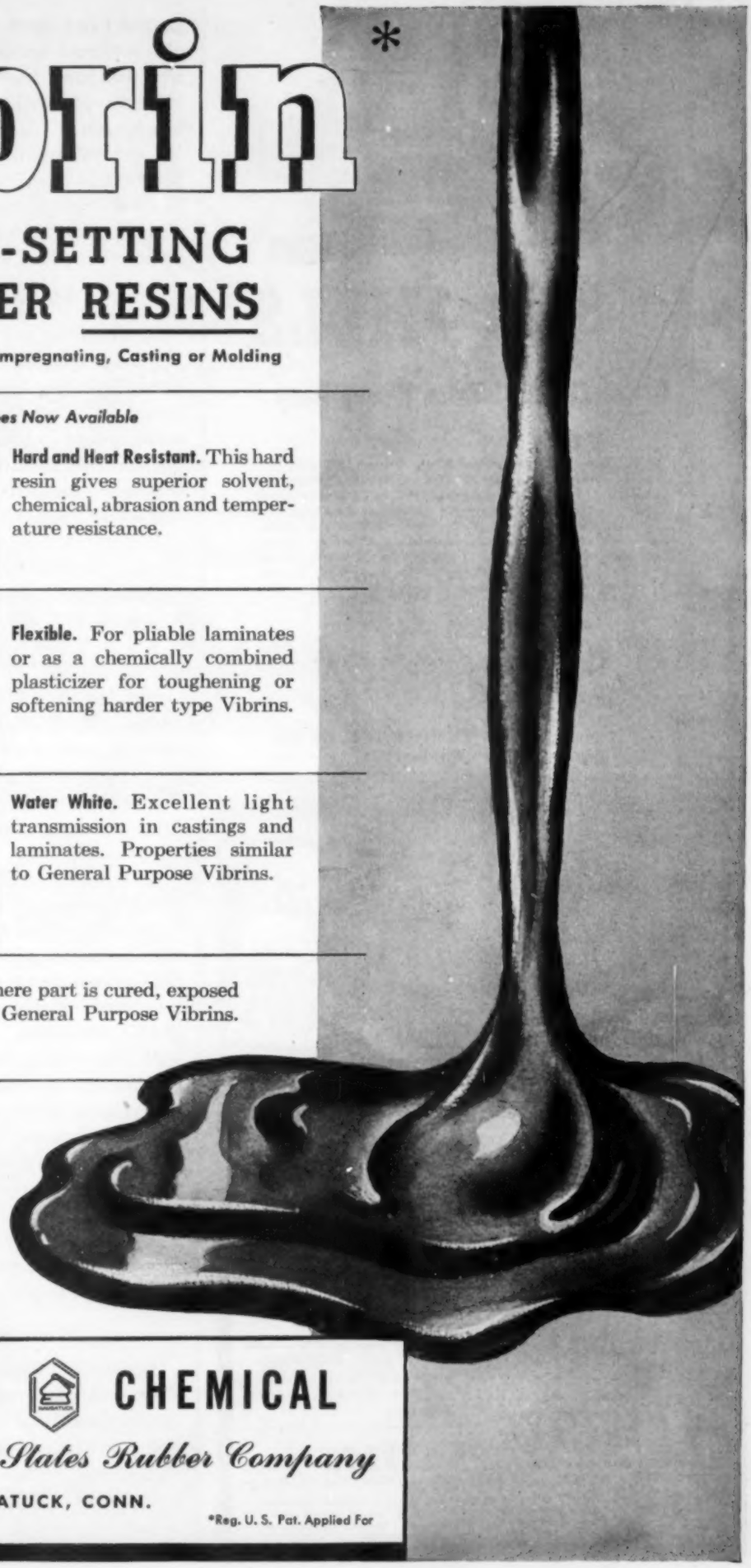
Self-Extinguishing. For laminatives where fire resistance is necessary. Light colored, medium viscosity. Tough, medium hard.

Flexible. For pliable laminates or as a chemically combined plasticizer for toughening or softening harder type Vibrins.

Wax Consistency. Paste consistency and excellent pot life. Simplifies the preparation of large or complex laminates. Gives dry powdered mixes suited to short cycle molding.

Water White. Excellent light transmission in castings and laminates. Properties similar to General Purpose Vibrins.

Air Curing. For saturations where part is cured, exposed to air. Properties similar to General Purpose Vibrins.



Other types available or made for special applications. Shipments in 50 gallon drums and 5 gallon containers from Naugatuck, Conn., or Los Angeles, Cal. Technical bulletins available on these resins and on application practice. Write

NAUGATUCK CHEMICAL

Division of United States Rubber Company

NAUGATUCK, CONN.

*Reg. U. S. Pat. Applied For

shaped blast fibers 1/16 to 1/8 in. long. The character of this fibrous material adapts it for use as a reinforcing filler for hard, high density end products to improve strength properties and to minimize shrinkage. A breakdown of No. 508 shows it is 48.8 percent carbon, 5.9 percent hydrogen, 45.1 percent oxygen and 0.1 percent nitrogen. Its physical properties are as follows: average particle size, 20 microns; apparent specific gravity, 0.37; moisture content, O.D. basis, 10 percent; pH of water extract, 4.

A binder and reinforcing agent

In thermosetting molding compounds Silvacon No. 412 has proved its use as a reactive ingredient. In cold molded plastics it is used as a binder. It is also being tested as a reinforcing agent in both thermoplastic molding and casting resin. However, this product is not a direct substitute for woodflour and resins, and processing methods must be adapted to bring out the full advantages.

In composition, No. 412 is 25 percent cork and 75 percent lignified fibers—two basic constituents of tree bark. Chemically it is 51.3 percent carbon, 6.2 percent hydrogen, 42.3 percent oxygen and 0.2 percent nitrogen.

A reactive ingredient

Silvacon No. 472 is used in phenolic molding compounds as a reactive ingredient with resin. Used in a molding compound with 35 percent resin, it is said to make an excellent thermosetting compound. Like No. 412, this product is not a direct substitute for woodflour and resins, so that processing methods must be adapted for it.

It is a combination of three basic constituents of conifer bark—20 percent cork particles, 40 percent lignified fiber and 40 percent powder. The cork particles are thermoplastic in nature; the finely fractioned fibrous material is relatively inert chemically and the powdered amorphous material also exhibits thermoplastic properties. The cork and powder tend to react with resins and aldehydes and become thermoset.

Chemical analysis shows it is 52.9 percent carbon, 6.1 percent hydrogen, 40.8 percent oxygen and 0.2 percent nitrogen. Its physical properties are: average particle size, 10 microns; apparent specific gravity, 0.32; moisture content, O.D. basis, 10 percent; pH of water extract, 3.9.

Besides its proven value in the plastics field, No. 472 is being used as an ingredient in match ignition compounds and in phenolic adhesives.

Other products

Besides the three Silvacon products which have been discussed, there are two others—No. 383 consisting predominantly of cork particles up to 1/4 in. and No. 490 consisting of finely powdered amorphous particles. No. 383 is marketed as a soil conditioner under the trade name, Topper, and is used successfully as a reactive ingredient in phenolic resin manufacture. No. 490 is used as conditioning agent for insecticide dust.

PHOTOS, COURTESY GENERAL ELECTRIC CO.

This new all-plastic boat can be maneuvered easily by only one person. It is 9 ft. long and weighs 80 pounds

An all-plastic boat

LIGHT WEIGHT with correspondingly greater speed, high tensile and impact strength, elimination of seams, and leakproofness are among the advantages of plastics in boat building. Incorporating these features is a new one-piece 9-ft. dinghy weighing 80 lb. which has just been marketed by the Beetle Boat Co. of New Bedford, Mass.

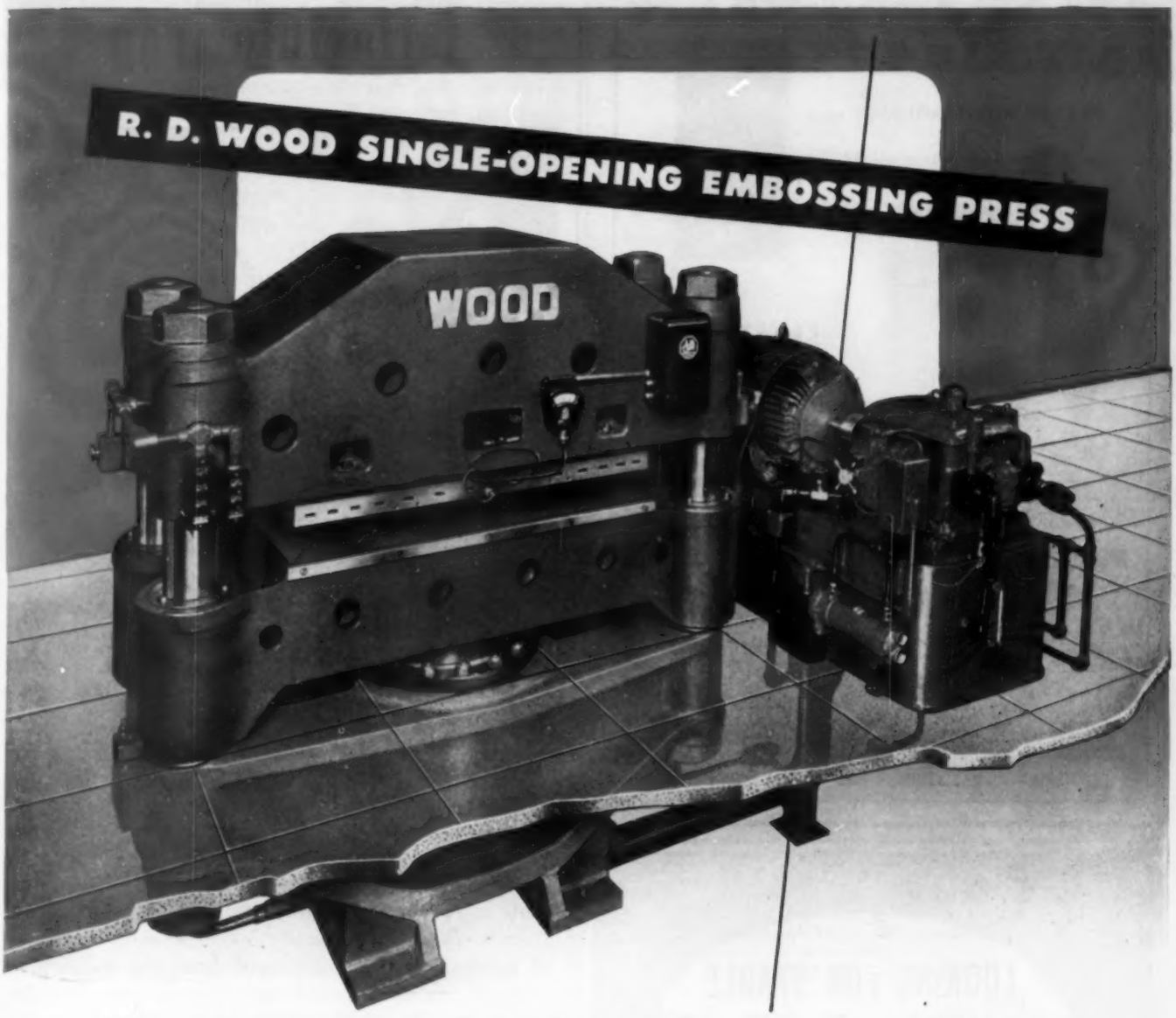
This boat, known as Beetle PG-9, is molded of Fiberglas and a low pressure thermosetting resin by the Plastics Div. of General Electric Co., Pittsfield, Mass. Its unusual strength is gained in construction by the building up of layers of glass fibers and synthetic resin which are cured by steam heat and pressure. Three rope holes and four oar lock sockets with metal inserts are molded in the boat. Outboard motors may be easily attached.

A plastic foam in seats, gunwale

A plastic foam is used in the molded seats and gunwale to give a permanent buoyancy to the boat. This allowance for buoyancy also makes it possible for the boat to accommodate five persons quite easily.

Because of its good maneuverability, it may be used wherever a small craft is desired. It can be stored without regard to climate and will not be attacked by either salt water or worms.

A low pressure thermosetting resin and a glass mat material are employed in molding this new lightweight boat



For EMBOSSING LEATHER and SIMULATED LEATHER

This fully-automatic, single-opening, 500-ton embossing press utilizes a synchronized feeding mechanism to move the sheet material through the press. It operates at a maximum speed of twelve cycles per minute, and can be arranged for semi-automatic operation for the embossing of skins.

The electrically heated top platen is made from special process firebox steel plate with 14 strip heaters, and is furnished with a smooth tool finish on the top and bottom surfaces. Presses are manufactured for any platen size or capacity necessary to meet requirements.

Hydraulic power is supplied by a motor driven radial piston pump with a centralized control system which provides for either automatic or manual operation. An emergency stop button is provided to immediately halt the cycle and return the platen to full open position.

For more detailed information about this press or for engineering advice, write R. D. WOOD COMPANY, Independence Square, Philadelphia 5, Pa.

HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE • ACCUMULATORS • ALLEVIATORS • INTENSIFIERS

R.D. Wood Company

EST. 1803

A flexible iron

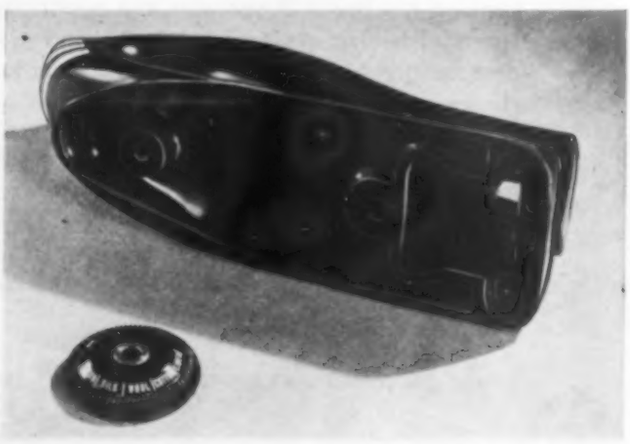
PHOTO, COURTESY YALE & TOWNE MFG. CO.

An easy forward pressure tips front of iron, making it just right for nosing into gathers. Back is off of board

AN electric iron designed to iron out one of the housewife's major problems has been introduced on the market by Yale & Towne Mfg. Co., 350 Fifth Avenue, New York City. Its two-part sole plate makes possible the tipping of the iron on the toe. Thus it acquired its name, Tip Toe, and thus it can iron the finest of frills without awkward manipulation.

The first iron of its kind—having a two-piece sole plate and separate cast-in heating units in each part of the sole plates—it naturally called for a different type of handle. Here plastics have been able to keep up with the new development and a general purpose Bakelite phenolic was used in the molding of the iron handle.

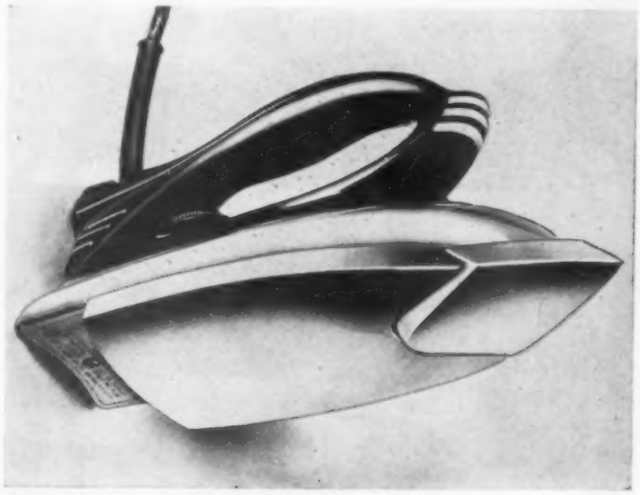
The handle, that is smaller at the grip than most handles since the manufacturer found it more comfortable to the average ironer, incorporates other features which adapt it to the iron. It has a forward



View of phenolic handle shows cut-out section at back for reversible rubber socket. Dial fits in recess not shown

angle that facilitates tipping. At the back there is a cut-out section to accommodate the reversible cord and the rubber socket that can be turned to either side of the iron. Also at the rear of the handle is a recess for the thermostat dial. Its location keeps the part from being subjected to the heat emerging from the iron, even while the iron is stood on end during resting periods. Shielding the hand from heat is accomplished primarily by the base of the iron handle that completely covers the top of the iron. Just below the handle may be seen a series of slots used for ventilating and allowing hot air to escape. These together with the large base help make the handle one of the coolest on market.

Shaw Insulator Co., 160 Coit St., Irvington 11, N. J., molds the handle in a 4-cam, semi-automatic, top ram, transfer mold produced by Kline Manufacturing Co., Galenna, Ohio. All side cores are operated automatically as the mold opens and closes. Several inserts for



PHOTO, COURTESY YALE & TOWNE MFG. CO.

Hinged sole plate and toe are in flexed position here

screws are molded in, and two of these have metal pieces pressed in immediately after molding.

The knob is molded by Boonton Molding Co., 626 Myrtle Ave., Boonton, N. J., and is made of asbestos-filled Bakelite phenolic. All serrations and one metal insert are molded in the one operation. Finishing merely requires the filling in of the figure marks with a white paint.

Merchandising the iron

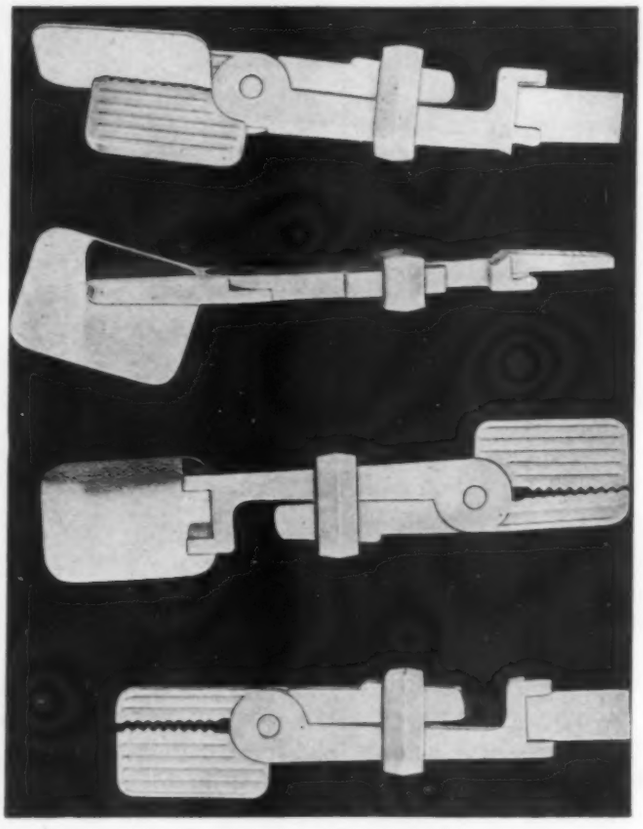
Two colors of blue are used for the iron box that is edged with gold. It is constructed to make possible stacking or pyramiding with four different display faces, since three sides of the package and the end have varying designs. Into each package is inserted a 16-page, two-colored brochure, "How to iron better, faster, easier with Tip Toe," which was prepared by a board of home economists and gives many ironing hints.

A demonstrating device for store interiors, a circular ironing board complete with colorful canopy, is being used to stimulate customer interest in the iron.

Dental X-ray holder

THE ANNOYING finger-in-mouth technique commonly associated with the taking of dental X-rays is a thing of the past with the development of the Rinn Snap-a-Ray, an ingenious little polystyrene tool which enables the attendant to place the films in all parts of the patient's mouth without discomfort.

The invention of Dr. Harry J. Greene of Chicago, Ill., the Snap-a-Ray is so planned that either end of the device will hold the film, each end having a different type of holding feature so that all parts of the mouth may be reached by proper manipulation of the tool.



Polystyrene is used for all three parts of this dental X-ray film holder. Positions of film are shown above

Because it solves a persistent and bothersome problem associated with dental X-ray technique, it has been welcomed by the profession as well as by patients.

Creative Plastics Engineering Co., 1849 N. Milwaukee, Chicago, molds three parts for Snap-a-Ray of Lustron. The molding is done with a 3-cavity die and a 1-oz. molding press specially modified to boost its capacity. The molder also performs the subsequent assembly operations, slipping the rectangular lock-ring into position and joining the jaws of the instrument together by swaging the end of the hinge-pin which is molded as an integral part of the shorter handle. A cold sterilization technique rather than boiling is required.

"Flexol"
Trade-Mark
PLASTICIZERS

"Flexol" Plasticizers are designed to meet industry's expanding needs for products with good general characteristics such as compatibility and low volatility. In addition, each "Flexol" Plasticizer is outstanding in producing one or more special properties such as low-temperature flexibility, resilience, or high impact strength.

"Flexol" Plasticizers are successfully serving industry in lacquers, artificial leathers, vinyl films and sheetings, vinyl butyral safety glass, and molded and extruded products based on the vinyl resins and cellulose derivatives.

The "Flexol" Plasticizers shown are in commercial production. Several more are available in research or development quantities. Consult us on availability.

Our laboratories have prepared extensive data on the performance of the "Flexol" Plasticizers for many uses. This information will assist you in selecting the right "Flexol" Plasticizer or mixture of plasticizers for your needs.

COMPATIBILITY OF "FLEXOL" PLASTICIZERS (20% OF COMPOSITION) WITH VARIOUS RESINS

	DOP	3GH	3GO	4GO	TOF	B-400	8N8
Vinyl Acetate	I	C	SI	C	C	I	C
Vinyl Butyral	C-L	C	C-L	I	C	I	C
Vinyl Chloride	C	C	C	C	C	I	C
Vinyl Chloride-Acetate	C	C	C	C	C	I	C
Cellulose Acetate	I	I	I	I	SI	I	I
Cellulose Acetate-Butyrate	C	C	C	SI	SI	I	—
Cellulose Nitrate	C	C	C	C	C	C	C
Ethyl Cellulose	C	C	C	C	C	I	C
Synthetic Rubbers	C	C	C	C	C	I	C

C—Compatible S—Slightly
I—Incompatible L—Plasticizer sweats out

A booklet on the general function of plasticizers and the specific uses of "FLEXOL" PLASTICIZERS, Form-5882, may be of help in your application. Phone or write our nearest office for this booklet or for samples and prices.

"Flexol" is a registered trade-mark of Carbide and Carbon Chemicals Corporation.

SYNTHETIC ORGANIC CHEMICALS

CARBIDE AND CARBON CHEMICALS CORPORATION
Unit of Union Carbide and Carbon Corporation
UCC
30 East 42nd Street, New York 17, N. Y. Offices in Principal Cities
Distributed in Canada by Carbide and Carbon Chemicals, Limited, Toronto

The housewife will find the acrylic lid on her dishwasher useful not only because she can see dishes being washed but because it is easy to clean and resists food acids

Acrylic lid for dishwasher

USERS of the new dishwasher by Kaiser Fleetwings, Inc., Bristol, Pa., will look through a Plexiglas dome to see their dishes being scoured. Not only does the acrylic in the lid give the user a view of the workings, but it makes the lid easy to handle because of the light weight of the plastic. The acrylic lid is also easy to clean and unaffected by food acids.

The lid is fabricated by K-Plastix, 580 Natoma St., San Francisco 3, Calif., in one piece from a flat sheet of high heat-resistant acrylic, $^3/_{16}$ in. thick and measuring 20 by 20 feet. The method used to form the lid is a combination of deep drawing and controlled free blowing. The draw, however, is quite shallow.

Dome-shaped for strength

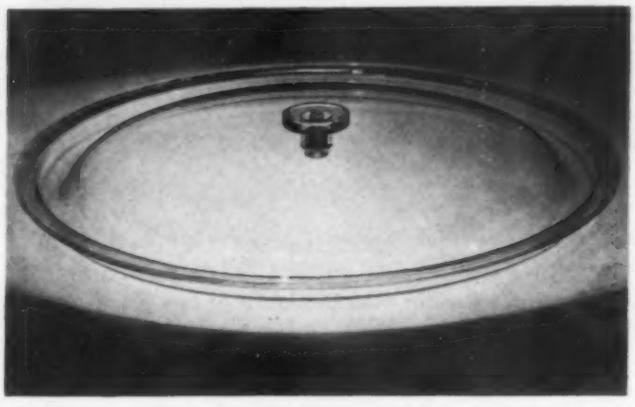
Even the rim and return are formed in the single fabrication operation—thus eliminating all cementing operations—with a resultant saving of manufacturing steps and reduction of production costs. Only the valve and knob remain to be attached.

The cover is formed as a dome to give it greater

strength and to prevent warping that might otherwise result from expansion and contraction. The material was chosen to wthstand 145° F., which is required for proper dish washing. High heat-resistant acrylic is proof against 195° F.

Originally the lid was planned to work on a hinge, but such an arrangement was found to be impractical since most kitchens provide space for the dishwasher beneath the cabinets. These would give no clearance to the lid when opened. Instead the lid is made to be lifted off rather than opened up.

Reports from users have indicated no difficulties from scratching or fogging due to food particles being propelled against the inside surface. Nor is there any place for those particles to lodge on the smooth surface of the lid. Grease and acids in the food will not affect the acrylic. Neither will the cleansing agent, an alkaline detergent solution which serves to hold the food particles in suspension. That is probably the single greatest advantage the housewife will see in this new plastic lid.



Fabricated in one piece from a sheet of acrylic, 3/16 in. thick, lid requires no cementing, thereby saving manufacturing steps and greatly reducing production costs

In time some scratches on the outside surface will be evident, but these can be easily buffed out.

Knob serves as vent

The knob, made of acrylic, is attached by a combination of cementing and mechanical work. A nipple is threaded into the knob and serves as a vent to prevent the formation of a vacuum when the dish water is drained off.

The acrylic knob is particularly useful in that it can never become excessively hot, no matter what the temperature of the water inside the machine. It can always be grasped without any need for a towel or pot holder.

The lid first appeared on demonstrator models of the dishwasher, but company officials have announced plans to fit the de luxe model with the same type of acrylic cover.

Know How + Perbunan = a top-notch pipe wiper!

THE QUESTION WAS . . . to find out how rubber drill pipe wipers could be made to stand up better under the beating they have to take from constant friction, abrasion and contact with crude oil, gas and other rubber-destroying hydrocarbons in oil field operations.

THE ANSWER WAS . . . A PERBUNAN compound plus the proper design. This combination was developed by research engineers of HARBOR RUBBER & PLASTICS, INC., Long Beach, California, working with the engineers from the BAROID SALES DIVISION OF NATIONAL LEAD COMPANY in designing a replaceable insert pipe wiper. The Perbunan compound provided a flexible, replaceable insert *with exceptional resistance to friction, abrasion, oil, and other hydrocarbons normally destructive to rubber!*

ALSO REMEMBER THIS: Perbunan now contains a new stabilizer that permits its use in a wide variety of colored articles where delicate colors are desired . . . and where discoloration of the rubber part or materials in contact with it would be objectionable.

If You Have a Rubber Question that needs an answer . . . please write to our office nearest you.

PERBUNAN
REG. U. S. PAT. OFF.

THE RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME

ENJAY COMPANY, INC., 26 Broadway, New York 4, N. Y.; First Central Tower, 106 South Main Street, Akron 8, Ohio; 221 North LaSalle St., Chicago 1, Illinois; 378 Stuart Street, Boston 17, Massachusetts. West Coast Representatives: H. M. Royal Inc., 4814 Loma Vista Avenue, Los Angeles 11, California. Warehouse stocks in Elizabeth, New Jersey; Los Angeles, California; Chicago, Illinois; Akron, Ohio; and Baton Rouge, Louisiana.

KEEPING X-RAYS WHERE THEY BELONG

X-ray apparatus is afforded a maximum of safety and flexibility with this ray-proof plastic housing molded by Shaw. It consists of three molded pieces, integrated to form a structure of great strength and durability. The plastic used was Bakelite XM-7436, a material which combines opacity to X-rays and high voltage insulation properties.

On all plastics applications involving special functional problems, Shaw's experience assures you of the right selection of materials and correct molding methods. With Shaw, you have behind you a skilled technical staff and a plant equipped to cope intelligently and imaginatively with the most complicated plastics assignments. This means top performance for your product and a maximum of economy in making it.

SHAW

SHAW INSULATOR COMPANY

MOLDERS QUALITY MARK ON MOLDED PLASTICS SINCE 1892

160 COIT STREET IRVINGTON 11, N. J.

PLASTICS LITERATURE AVAILABLE

Shaw engineers have prepared a variety of literature, study of which might help you to a decision. Simply write a note about what phases of plastics especially interest you.

Or, you may prefer at once to call in a Shaw engineer, and present your problems for his study. This company's fifty-five years of plastics experience gives him a rich background from which you can draw.

Between the resources of Shaw and the Plax Corporation, Hartford 5, Conn., you can obtain assistance in almost all plastics methods and materials.

REGAL BUT ECONOMICAL PACKAGING

Products packaged in Plax Polyflex* Sheet are displayed in a setting that can't be matched for smart, crisp, distinctive simplicity—and for low cost.

Plax Polyflex Sheet can be adapted to standard packaging methods, and it is ideally suited to display. Free of discoloration, its natural brilliance is not affected by exposure to light or temperature change. Inherently strong and flexible, it retains its freshness under normal handling and storage conditions.

Here is a versatility that package designers can use to good advantage, in protecting, presenting and displaying products. Here is packaging material that makes a product gleam in the customer's eye. Write Plax for complete details.

*T.M. REG. U.S. PAT. OFF.

WRITE FOR THIS POLYSTYRENE DATA

How to Machine Plax Polystyrene Products.
How to Use Coolants with Plax Polystyrene Products.
How to Cement Plax Polystyrene Products.
How to Polish Plax Polystyrene Products.
Notes on Design and Assembly of Plax Polystyrene Products.
Die-cut Parts from Plax Polystyrene.
How to Form Plax Polystyrene Rod.

AND THIS PRODUCT INFORMATION

Data Sheets on Plax Cellulose Acetate, Cellulose Acetate Butyrate, Methacrylate, Polyethylene, Polystyrene and Ethyl Cellulose Products.
Article on Plax's Blown Products.
New special plastic shapes by Plax.

PLAX
FOR PLASTICS
NOT SUBSTITUTES···IMPROVEMENTS

133 WALNUT STREET ★ HARTFORD 5, CONNECTICUT

Two shavers that

1
Plastics lend both utility and display values to the container of this shaver which doubles as a permanent holder

THE TREND in the packaging of shavers has been toward a multi-purpose container—one which can be used as a counter display piece for retailers and still be of utilitarian value to the consumer in the home. Typical examples of this trend are two shaver cases which have recently been placed on the market. One (Fig. 1), displays the Collman 58 razor made by the Collman Mfg. Corp., Erie, Pa., and the other (Fig. 3), is for the Gem razor manufactured by the American Safety Razor Corp., Brooklyn, N. Y.

Suitability of plastics

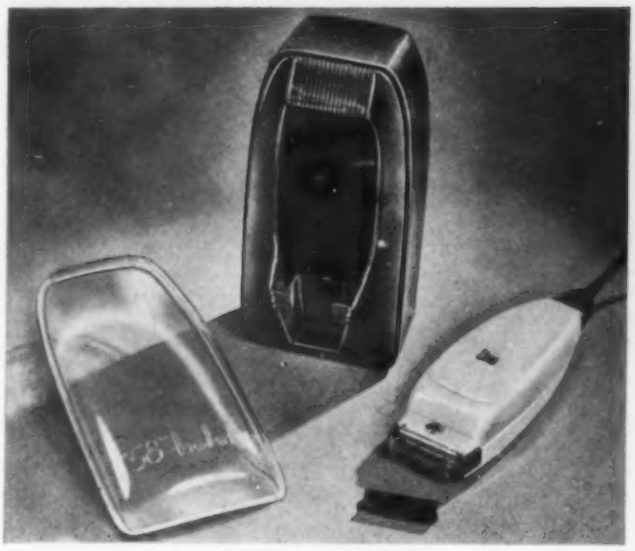
Plastics have already made great progress as materials for the housings of electric shavers themselves. This is primarily due to the adaptability of the material, to its molding properties which permit it to be formed to fit the grip of the hand and give insulating properties at the same time. The molding properties are also important in holding and display cases for the shavers, though more important in this work perhaps are the color possibilities and the transparency of some plastics.

Color can be used very effectively to attract attention in retail outlets thus creating the first urge to buy the product. Transparency allows display of product at the same time it is protected from handling, dust, and a certain amount of moisture. When manufacturers take the precaution of packing a product in a sturdy container that can be used during shipments, an economy in time and money is effected.

The two manufacturers of shavers—electric and non-electric—represented here have cleverly put all of the advantages of plastics to work for them.

The "holster" case which houses the new Collman

use plastics



2

Clear polystyrene and cellulose acetate butyrate make the holder; urea, butyrate and phenolic are used in shaver

58 electric shaver serves a triple rôle. It can be used as a display case in the store, as a handy carrying case for travelers, or it can be hung on the bathroom wall and used as a holder for the shaver. The cord—an endless source of annoyance if it has no proper storage space—is coiled inside the case when not in use.

This holster, designed by Wilbur Henry Adams, consists of a Loalin transparent cover produced in a 4-cavity mold and a base of dubonnet red Tenite II produced in a 4-cavity mold (Fig. 2). It is being molded by Perry Plastics, Inc., of Erie, Pa.

Not only are plastics used in the display holster but also in the housing of the shaver and in parts making up the shaver. Perry Plastics molds the housing of Beetle in a 3-cavity compression mold. The starter button, whisker bibs and head protector are injection molded of Tenite II in a 24-cavity die—six cavities for starter buttons, six for the head protectors and 12 for the whisker bibs.

The internal motor frame is transfer molded in an 8-cavity mold by Waterbury Companies, Inc., 835 S. Main St., Waterbury, Conn., and the oscillating lever fork is transfer molded in an 8-cavity mold by Bliley Electric Co. of Erie, Pa. Bakelite or Durez are used.

Polystyrene and acrylic used

A streamlined plastic case has been used by the American Safety Razor Corp. to introduce its new Gem "Guiding Eye" razor. Besides offering the dealer an excellent display item, it provides the owner with a handy container in which to keep the razor on the bathroom shelf or to use in travel.

Three different colors of polystyrene and clear acrylic

3

Clear acrylic and three different colors of polystyrene are employed in the display case and holder of this razor. The designer found that the polystyrene had sufficient elasticity to permit the razor and blades to be snapped in and out of the platform of the box, eliminating rattling

4

are used in this case which is injection molded in four parts. Styron and Lustron are employed for the ivory platform, the red name plate and the emerald green base. As can be seen in Fig. 3, the platform is molded so that a razor and a box of blades can be inserted in the spaces provided. The elasticity of the material allows these items to be snapped in the platform where they are held tightly. The cover is of shatter-resistant crystal-clear Plexiglas or Lucite. Formed from $^{3}/_{32}$-in. acrylic, this cover adds brilliance to the product display and permits full view of the gold-plated razor and sheath of five blades. It is fabricated by Plastic Molded Arts, Inc., 12-04 44th Ave., Long Island City, N. Y., who also mold the polystyrene parts.

The lid is hinged to the base with metal pins. The platform or tray snaps into the base and has openings for holding the razor and the metal box for blades. The name plate is affixed to the tray. A protector piece of paperboard holds razor in place until displayed.

Skyrider

Compression Molding

OF THINGS TO COME . . .

The world of tomorrow will behold innovations in product design tbat are but dreams today. Whether you are seeking a new table radio design or production of your own design, think of *International Molded Plastics Inc.* for quality molding.

INTERNATIONAL MOLDED PLASTICS, INC.

4387 WEST 35th STREET CLEVELAND 9, OHIO

Plastics for ulcers

OUT OF medical research has come a brand-new application for plastics—resinous pills that are taken internally as a treatment for stomach ulcers. These pills, made from a special type anion exchanger, were developed as a result of extensive studies of the Amberlites—ion exchange resins. By absorbing the excess acids in the stomach which cause ulcers, the pills, developed by the National Drug Co., 441 Lexington Ave., New York City, are said to cure the ulcers and offer immediate relief of pain. Dosages are said to be entirely harmless to body functions and organs, and not to destroy or in any way inhibit the nutrient value of vitamins, proteins, etc.

Resin absorbs harmful acids

Gastric ulcers are attributed to the action in the stomach of excessive acid and to the enzyme, pepsin. To cure ulcers, physicians use therapy that removes the acid and inactivates the pepsin. Resinat, as the plastic pill is called, acts in the stomach by absorbing the acids onto its surface.

When the resin passes into the intestines the hydrochloric acid picked up is returned to the body for absorption. The resinous dosage also inactivates the pepsin and absorbs and removes toxic chemicals which cause fatigue, thus affording additional protective action to the patient.

Taken in water or capsule

Resinat is a tasteless yellow powder that may be mixed with water or taken in capsule form. It can be taken in large quantities without toxic effect on the patient and without the harm that usually follows the aluminum hydroxide antacid treatment. Some tests, made on 30 chronic ulcer patients by Drs. Mary Spears and Mildred Pfeiffer of Women's Medical College in Philadelphia, showed that the resin treatment was successful in the case of all but one patient. The abovementioned physicians and Dr. Manfred Kraemer of the Presbyterian Hospital of Newark, N. J., recently published an article in the Journal of Gastroenterology on the results of their findings.

The ion exchange resin

The Amberlites, on which the development of these pills rests, were originally used as a water purifier. Later they made possible the recovery of pure protein, or amino acids, from food waste.

However, these did not end the uses for the ion exchange resins, as they have also made possible the commercial production of quinine and scopolamine (a seasickness preventative), the preparation of vitamins and streptomycin, the recovery of precious metals from industrial wastes and the conversion of sea water into drinking water.

Books and Booklets

Write directly to the publishers for these booklets. Unless otherwise specified, they will be mailed without charge to executives who request them on business stationery.

Encyclopedia of Hydrocarbon Compounds, Vol. II—C_6 and C_7

Compiled by Joseph E. Faraday

Published by Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y.

Price $17.50 **603 pages**

Compounds containing 6 and 7 atoms of carbon are covered in the second volume of this encyclopedia which employs a loose-leaf system for easy addition of new material. It presents molecular and structural formula, occurrence in nature, trivial names, methods of preparation, physical constants, methods of defections and outstanding properties. Data on free radicals on hydrocarbons containing heavy hydrogen and the carbon isotope 13 are included.

Experimental Casting Plastics

by Thomas A. Dickinson

Published by Plastics Research Co., Box 346, Alhambra, Calif.

Price $2.00 **30 pages**

This 30-page book is the result of an experimental research program undertaken by the author. It is a report which is devoted to formulae and simple new methods of making rigid or flexible patterns, molds and casts from plastics or for use in connection with plastics. Photographs and drawings illustrate certain portions of the text and numerous bibliographical references are presented for the benefit of those who may wish to undertake additional research work.

Phenoplastics

by P. Monthaérd

Published by Dunod, 92, Rue Bonaparte, Paris (6°), 1947

Price 330 fr. **172 pages**

This book is of interest to the material supplier, molder, fabricator and to persons in the synthetic resin industry. Among subjects treated are the fabrication of phenoplastics, phenolic resins, use of lignin and action of formal and aldehydes on products other than phenols.

S.P.I. Directory for 1947—The Society of the Plastics Industry, Inc., 295 Madison Ave., New York City, has just published its fourth annual directory. This 276-page book includes a listing of company and professional members here and outside the United States, product, material and machinery indexes and a "Who's Who" in the plastics industry. Information not previously covered in the book includes a listing of officers from 1937 on and of John Wesley Hyatt award winners, a brief detailing of the activities of S.P.I. and its committees. Two tip-in charts of the society's activities and committees make for easy reference.

Reference booklet—An attractive multicolor 24-page reference booklet on plastics has just been brought out by G. Felsenthal & Sons, 4100 W. Grand Ave., Chicago 51, Ill. This booklet discusses injection molding, blow molding, mold, tool and die making, assembly and inspection, laminating, printing, spraying, filling, silk screening, heat sealing and product design. Photographs of industrial and electronic parts including dials, nameplates, clock cases, razor cases, calculators and computers, radio handles, automobile parts, sales aids and consumer merchandise show the range of company products. Problems encountered in producing some of these parts are discussed. In the back of the booklet is a glossary of plastic terminology containing descriptions of the properties of the plastics used by the concern. These are cellulose nitrate, cellulose acetate, cellulose acetate butyrate, cellulose propionate, ethyl cellulose, polystyrene, vinyl chloride acetate, vinyl chloride, polyethylene, acrylic and nylon.

Abrasive—Norbide abrasive, a substitute for diamond powder in the cutting and polishing of materials having a Moh's hardness of 8 or more, is described in a new bulletin just released by Norton Co., Worcester 6, Mass. It can be used for lapping for cutting and polishing, wire drawing dies, lapidary work.

Rotary files—A 16-page booklet illustrating and listing the different rotary files made by Grobet File Co. of America, 421 Canal St., New York City, has just been published. These include ball, oval, cylindrical, cone, inverted cone, etc., each in a range of diameters and lengths of cut.

Glass fiber materials—"The case of Material X" is the name of the new booklet issued by Owens-Corning Fiberglas Corp., Toledo 1, Ohio, describing Fiberglas materials used for plastic reinforcement, properties imparted to plastics by these materials, and newly developed processes. Photographs include those of end products such as car body parts, luggage, fishing rods, etc.

Hand screw machine and lathes—Special features of the company's Speedi-Matic hand screw machine, Model M and Model C lathes are described in an attractive booklet, Bulletin 7, just issued by Monarch Machine Tool Co., Sidney, Ohio. Testing of headstock spindles of the lathes for accuracy is described. Another portion of the booklet discusses the helical gear headstock and method of turning electric-weld steel pipes 89¾ in. long, 10¾ in. in diameter and with a finished wall thickness of 0.365 inch.

Export catalog—The Gauge and Tool Makers' Association of Great Britain has just published an export catalog for 1947 listing gages, jigs, fixtures and special tools, press tools, molds and dies, diamond tools which are now available for export. The catalog, the first issued by the group, is in four editions—English, French, Spanish and Portuguese.

Acrylic manual—For use in the school shop, for the home craftsman and occupational therapist, Rohm & Haas Co., Washington Square, Philadelphia 5, Pa., has just issued a 72-page manual entitled, "Working with Plexiglas." This handbook gives directions for making an assortment of plastic items. Numerous sketches show the worker exactly how it is done. Sections of the book deal with storing and handling Plexiglas, cleaning, cutting and machining, finishing, forming, joining, design, sheet specifications and recommended materials, supplies and equipment. It may be obtained from the firm for $1.50.

Valves and fittings—Valves and fittings of stainless steel and other corrosion resistant alloys are described in Catalog No. 47 just released by Alloy Steel Products Co., Linden, N. J. They are widely used in the manufacture and processing of chemicals,

dyestuffs, food and beverage, oil refinery products, plastics, pharmaceuticals, pulp and paper, soap and fatty acids, textiles, etc. One section of the catalog lists corrosive mediums and the recommended alloys for use with them.

Time-cycle controllers—A new 11-page bulletin, C 305, on the Model C500 impulse-sequence cycle controller, which is designed for use on tire presses and other plant processes where a number of factors must be accurately controlled according to a time program, has been issued by the Bristol Co., Waterbury 91, Conn. This multiple-cam instrument has time measurement and pilot valve operation handled separately, thus eliminating the necessity of the timing apparatus doing the work. It makes possible the use of a large timing disk, having a scale 25 in. long.

Releases on the German plastics industry—The U. S. Dept. of Commerce is issuing reports on various phases of the German plastics industry. Among the microfilms which may be obtained for $1.00 from this department, Office of Technical Services, Washington 25, D. C., are reports entitled "Polyvinyl Chloride Production at Burghausen and Ludwigshafen," "Strength and Hygroscopic Properties of Light Materials," "Determination of the Useful Life of Synthetic Resin Glues by Means of Viscosity Measurements" and "The Production of Styroflex Film."

Work review—Wartime activities along with work being done on peacetime products are reviewed in a new brochure issued by Lawrence H. Cook, Inc., of 65 Massasoit, East Providence 14, R.I.

An organic hydroperoxide—A bulletin on Uniperox 60, a liquid organic hydroperoxide, has been released by R. T. Collier Corp., 714 W. Olympic Blvd., Los Angeles 15, Calif. Physical and chemical properties of Uniperox 60 are listed along with data for several of its applications. This product, although highly reactive as a polymerization catalyst and an oxidizing agent, is said to have marked thermal stability and not to be sensitive to shock.

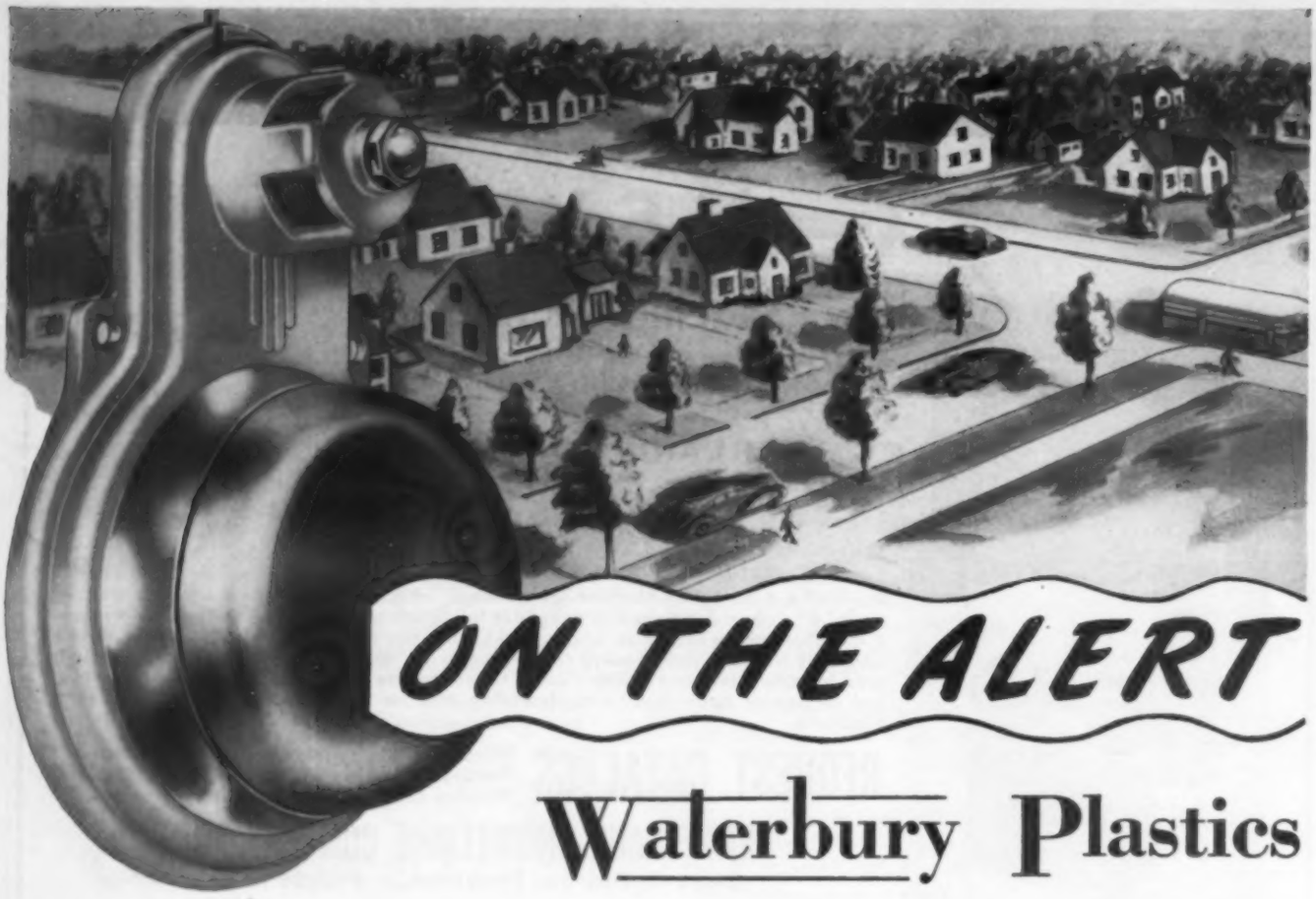
Centrifugal process pumps—A new line of centrifugal process pumps designed for severe wear and adaptable to the chemical, food and paper industries has been announced through Bulletin 08B6615, just released by Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. These pumps, recommended for handling corrosive and abrasive liquors, are equipped with larger shaft, heavier bearings.

Rubber base and resin base adhesives—Types of adhesives in the Bostik line and the products in which they can be used are covered in a new folder put out by B. B. Chemical Co., 784 Memorial Drive, Cambridge, Mass.

Corrosion resistant materials and equipment—The range of company products and the ways they are used for combatting corrosion are presented in Bulletin K, recently put out by U. S. Stoneware Company, Akron 9, Ohio. Materials described include Tygon, Tygoflex, rubber, resilon, ceramics, Duralon, acid-brick and cements, lead.

Fatigue testing—In Vol. 2, No. 8 of Testing Topics, put out by Baldwin Locomotive Works, Philadelphia 42, Pa., results of fatigue testing of rubber parts at such speeds as 1800 c.p.m. are given. Two new machines for high temperature testing of materials—creep machine and SF-4 fatigue machine—are also described in this issue.

Solvent recovery—A revised edition of the booklet, "Solvent recovery by the 'Columbia' activated carbon system" has been published by Carbide & Carbon Chemicals Corp., 30 E. 42nd St., New York City. This 36-page booklet contains information on solvent recovery and other applications of activated carbon. It gives details on solvent recovery systems, equipment used, costs and recommended industrial uses.



ON THE ALERT

Waterbury Plastics

Made for
Scots Guard, Inc.

and the SCOTS GUARD Alarm

. . . stand guard together in thousands of American homes, night and day, to warn against fire. This unit, designed and engineered by *Waterbury*, has a plastic mounting-back that not only securely houses the alarm but assures reliability of performance.

Waterbury offers you a choice of compression, transfer, high-speed, and injection molding . . . thermosetting and thermoplastic materials — complete facilities that provide the utmost in economy and efficiency. And because *all* these facilities are in *one* large plant, every step from drafting board to buffing wheel is under single, direct supervision.

Let *Waterbury* serve you in your molded plastic needs.

Our technical staff will gladly consult with you. Write for *Waterbury* "Plastics" catalog.

WATERBURY
SALES REPRESENTATIVES

New York 17, N. Y. — 17 E. 42nd Street
D. Gray Maxwell

Boston 11, Mass. — 99 Chauncey Street
R. N. Simpson

Detroit 7, Mich. — 6460 Kercheval Ave.
Wm. Robert Wilson

Rochester, New York — 124 Allen Street
Leon W. Sage

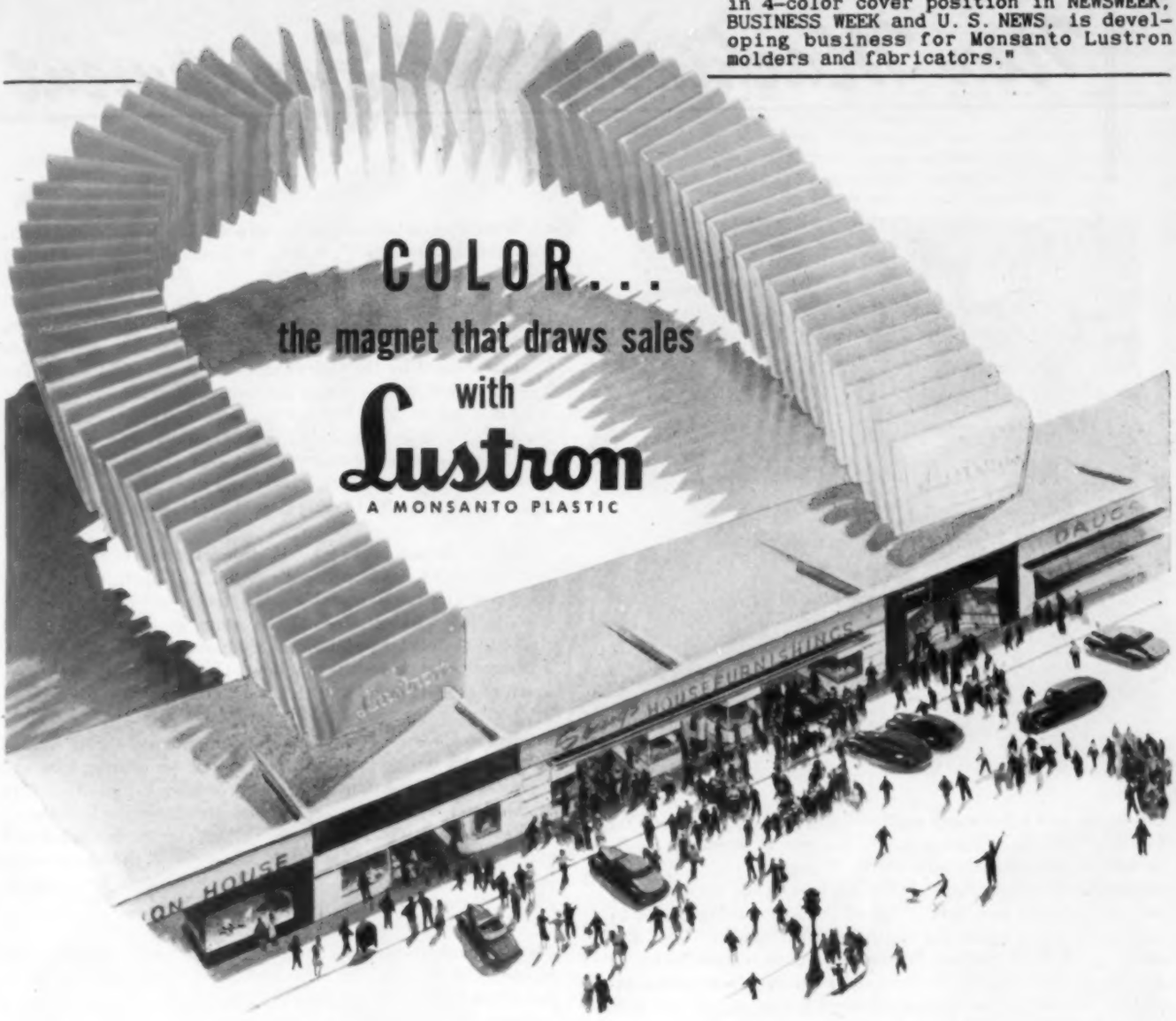
Cleveland 12, Ohio — 13611 Sixth Ave.
H. H. Baughman

Chicago, Illinois — 223 W. Jackson Blvd.
B. B. Myers

Waterbury Companies, Inc.

777 SO. MAIN ST. WATERBURY, CONN.

"This advertising message, appearing in 4-color cover position in NEWSWEEK, BUSINESS WEEK and U. S. NEWS, is developing business for Monsanto Lustron molders and fabricators."



For catching the buying eye . . . you can't over-look color.

- **Color advertisements get as much as 52% more observation.**
- **Color motion pictures set staggering box office records.**
- **And when leading manufacturers of widely varied products were surveyed, 84% of them said that color was of major importance in selling their merchandise.**

When it comes to color for your product, you'll find the whole spectrum harnessed to your needs when you choose Monsanto Lustron for your material. Color is a through-and-through, inherent part of this versatile polystyrene. It eliminates expensive finishing processes and extra materials.

Lustron color will not chip, peel, crack or wear away. It is odorless and tasteless. And Lustron's adaptability will enable you to put sales-making colors in places where they were never before possible or practical.

This modern Monsanto plastic offers you a choice of hundreds of eye-catching hues . . . transparent, translucent and opaque. Monsanto's color laboratories are ready to aid you in your color problems or to match colors to your specifications. Special consultants will help you with technical points.

It will pay you to find out right now how Lustron can benefit your product. Get full information from: MONSANTO CHEMICAL COMPANY, Plastics Division, Springfield 2, Massachusetts. In Canada: Monsanto (Canada) Limited, Montreal.

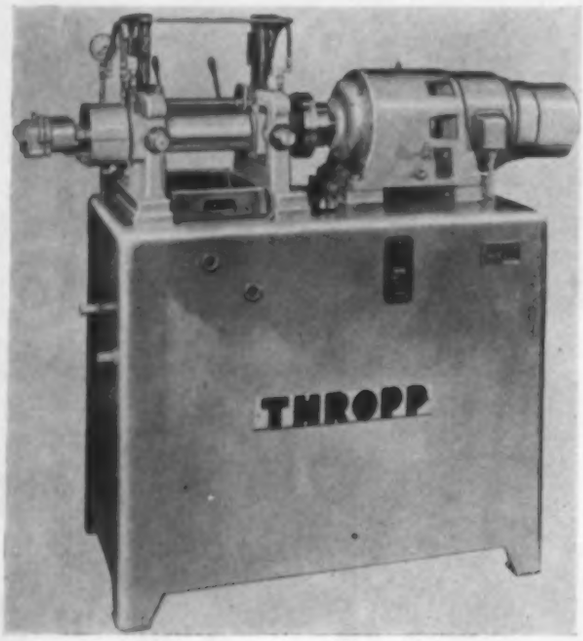
Lustron: Reg. U. S. Pat. Off.

8 LUSTRON ADVANTAGES FOR YOUR PRODUCTS
1 Rainbow range of colors, clear or opaque.
2 High dimensional stability.
3 Light weight.
4 Low price.
5 Excellent electrical properties.
6 Excellent resistance to moisture, acids, alkalies.
7 Finest molding qualities.
8 Freedom from taste and odor.

MONSANTO
CHEMICALS AND PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

New Machinery and Equipment



Calender and laboratory mill—Wm. R. Thropp & Sons Co., 968 E. State St., Trenton 5, N. J., has a three-roll, high-speed calender and a laboratory mill. Features of the 24 by 66-in. calender include self-aligning roller bearings on the roll necks and vertical inclosed herringbone speed reducer driving direct to middle roll, eliminating the master gear and pinion. This machine, which is shown here, is now under construction for use in the plastics and rubber industries. It is equipped with completely inclosed, self-contained lubrication system.

The laboratory mill has self-aligning roller bearings on the roll necks, enabling use of high roll surface temperatures. A direct drive to the fixed roll is arranged from the gear head motor through a flexible coupling. Guides are of the swing-up type.

Portable toggle clamp—A portable toggle clamp, designed for sheet metal work, plastic sheet cementing or laminating and other operations necessitating quick pressure on materials up to $^3/_8$ in. total thickness, has been announced by the Detroit Stamping Co., Dept. K, 327 Midland Ave., Detroit 3, Mich. Toggle-lock action holds parts in position for drilling, riveting, welding, gluing on such products as cabinets of plastic. It is suited for template locating and is adjustable for efficient pressures on various thicknesses.

Grinding coolant—A grinding coolant, Wheelyfe 85, has been developed by the Bee Chemical Co., 63 E. Lake St., Chicago, Ill. A clear solution, it is said not to load the wheel even with the finest grit sizes. Because of freedom from loading, the finish is determined by the grit size used.

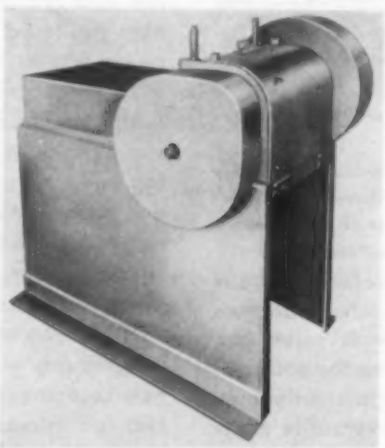
Self-acting center-punch—Wide-range, automatic control of the force with which the point is driven into the work is a feature of the Impakt self-acting center punch developed by Satterlee Products, 755 Boylston St., Boston, Mass. The low mass of individual turns in a coil spring moves a short distance at high velocity, imparting a sharp blow to the point. The impact is accurately controlled to suit varied requirements, and the punch can be used on metal and plastic surfaces. It is $^5/_{16}$ in. in diameter, 5 in. long and weighs $^1/_2$ ounce. A pencil size, the tool is also useful as a scriber.

Hose and fitting line—A new seamless flexible metal hose, fabricated of a special alloy bronze tube by a new method, has been announced by the Brockway Co., Naugatuck, Conn. The tube is formed into a uniform helically corrugated, flexible hose. For extra safety, long life and to prevent elongation, the Uniflex metal hose is incased in a high-tensile bronze wire braid. The fitting provides metal-to-metal seat by means of a seal produced between the fitting body and the spring washer effect of the hose itself. No brazing or packing is required.

Hydraulic arbor press—Air-Hydraulics, Inc., 401 Broadway, New York City, has introduced a 10-ton, foot-operated hydraulic arbor press for use in machine shops, tool rooms and garages for press fitting, staking, assembly, riveting, crimping, etc. Each stroke of the center pedal moves the ram $^7/_8$ in. down to work. The right pedal moves the ram down $^1/_{16}$ in. with each stroke. A touch of the left pedal and the ram returns to its position.

Mixing machine—For research and development work in connection with mixing problems that arise in the plastic, food and chemical processing industries, the Beardsley & Piper Co., 4710 W. Division St., Chicago 51, Ill., has introduced the Laboratory Mulbaro. This unit has a capacity of $^1/_4$ cu. ft. per batch and employs the same basic principles involved in the operation of larger mixing machines. It is furnished with a $^3/_4$-hp., three-phase, 60-cycle motor.

Slitting and mangling machine, and rotary chopping machine—Cumberland Engineering Co., Box 216, Providence, R. I., has added a slitting and mangling machine, and a rotary chopping machine to its line of plastics granulating machines. The former machine is useful to manufacturers who compound plastic materials. The machine accommodates sheet or slab material up to 18 in. wide, slitting it into ribbons of varying widths as desired and chopping into desired lengths. It may be used to reduce material for use as a commercial product ready for molding machines without further granulating, or may be used to prepare material for subsequent reduction in a granulating machine. It is adapted to handling vinyl, other elastomeric materials, cellulosic materials and other hard materials.



The chopping machine, pictured here, has standard capacity up to 14 in. wide. It is convenient for processing the same types of material in connection with recovery of continuously extruded scrap and rejected materials, for firms which calender

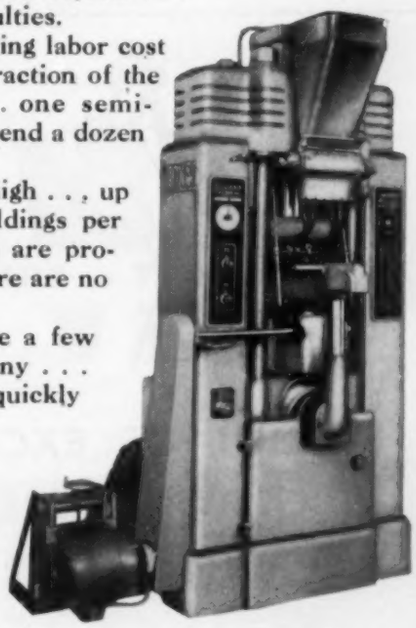
Tank Floats Molded 960 PER DAY Thanks to Automatic Molding

Kuhn & Jacob Molding and Tool Co., Trenton, N. J., molds these two-piece plastic tank floats on a 90-second cycle, 24 hours a day . . . and proves again that *it pays to mold automatically.*

These floats are molded on Stokes 50-ton Completely Automatic Presses, equipped with special unscrewing attachment. In performance, hundreds of Stokes Completely Automatic Presses demonstrate daily . . . throughout the country . . . the advantages and economies of this method of molding.

- Automatic Moldings are always of highest quality because they are produced under identical conditions of time, heat and pressure. There are no human errors to contend with . . . few rejects . . . no assembly difficulties.
- In Automatic Molding labor cost is an insignificant fraction of the total per piece . . . one semi-skilled operator can tend a dozen or more presses.
- Output per cavity is high . . , up to 10,000 or more moldings per cavity per week. Parts are produced as needed . . . there are no large inventories.
- Mold cost is low because a few cavities do the work of many . . . molds are quickly made, quickly put into production.

You also save money many other ways when you can Mold Automatically. Let us show you. Send samples or sketches and state production requirements for cost estimates and recommendations.



Stokes 50-ton Completely Automatic Molding Press with special unscrewing attachment. Patented in U. S. and abroad.

F. J. STOKES MACHINE COMPANY
5934 Tabor Road Philadelphia 20, Pa

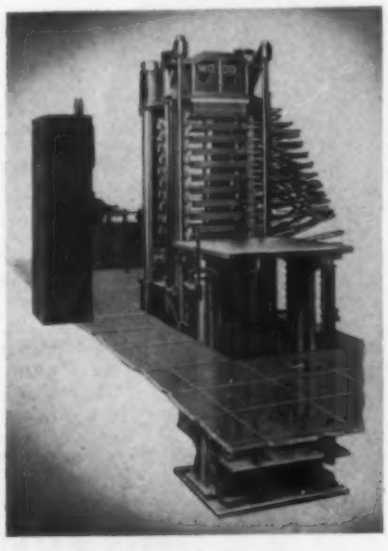
F.J.Stokes MOLDING EQUIPMENT FJS EST. 1874

sheet plastic materials, and for compounders of various thermoplastic materials.

Heat sealer and hand bonder—The Electronics Div., Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill., has announced a new $^1/_2$-kw. dielectric heating unit, Illitron heat sealer, and a new hand bonder. The sealer makes application of dielectric heating possible in a range of applications including the manufacture of water repellent garments and accessories from plastic fabrics. The equipment draws approximately only as much power as that needed to light a bank of ten 100-watt bulbs.

The new portable hand operated dielectric heating unit, called the Illitron speedbonder, is said to set glue in 7 to 10 seconds. Weighing a little under 3 lb., operation is controlled by an on-off thumb switch in the handle or can be automatically timed by setting a dial located on the generator. Specially shaped electrodes for varying the shape and size of the heating field are available. It is suited for light wood working, spot gluing veneers, applying decorative beading and cabinet repair work. It is also a $^1/_2$-kw. unit.

Platen press—A 285-ton precision type of platen press that is a complete sheet production unit has been introduced by R. D. Wood Co., Public Ledger Bldg., Philadelphia 5, Pa. The unit includes the press with a loading and unloading elevator, a two-pressure unit for operation of press and elevator, an automatic valve control system with complete automatic adjustable control of press operating cycle, including pressure application and regulation of platen temperature. This press has been designed especially for laminating and polishing plastic sheets. Its design provides for positive pressure and temperature controls required for the repetitive production of exactly uniform sheets which are 0.003 to 0.0750 in. thick.

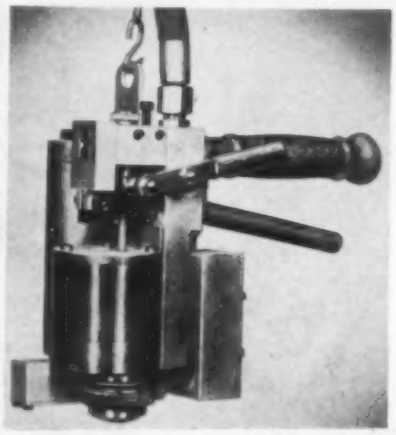


Injection molding press—Versa-Mold, an air-actuated ram press capable of exerting a ram pressure of 8000 lb. at 80 lb. line pressure has been announced by Ferracute Machine Co., Bridgeton, N. J. The double-acting air cylinder and press mechanism is inclosed in a streamlined frame. Directly below the ram is an

electrically heated material holding cylinder which is vertically mounted on an arm and supported by coil springs in such a way as to permit a limited up and down movement. The bottom of the cylinder has a suitable restricted outlet orifice or nozzle. Temperature is maintained by a thermostat and thermocouple which has a range up to 550° F.

Press—Designed for pressing requirements between 200 and 2000-lb. ram effort by the Denison Engineering Co., 1176 Dublin Rd., Columbus 16, Ohio, the new Multipress Midget offers all features of the larger Multipresses. It is suited for multiple installations and for successive operation requirements. One centralized power source will operate up to 12 units. When more than one press is used, each unit has individual pressure adjustments. Three different base-plate designs are available plus non-rotating ram guides, interchangeable valves for manual or vibratory action, adjustable daylight and throat depth clearances, and a choice of three pumping units for operation in series of 4, 8 or 12 Multipress Midgets.

Alloy sprayer—A self-contained precision type alloy sprayer for either intermittent or production spraying of low temperature metals and alloys melting in the 100 to 600° F. range has been developed by Metaloy Sprayer Co., 135 Liberty St., New York City. This Fiore alloy sprayer is designed to provide close control of the amount and characteristics of the spray. The cone of spray or area covered by the standard sprayer is about $2^1/_2$ in. in diameter when the nozzle is 12 in. from the object being sprayed. Of course, it depends upon spray setting. The design is such that the oxides formed when metals or alloys are melted, cannot reach the nozzle to clog it. Intermittent spraying without emptying the pot during off-periods is possible. Metal or alloy in stick form is inserted in the pot through the guide ring and feeds down as it melts. Metal or alloy can also be inserted in the gun by using ladle and funnel.



Roll coating machine—Columbia Machinery & Engineering Corp., Hamilton, Ohio, has introduced a new roll coating machine which is said to give a more uniform spread of adhesive, sizing, wax, paint or lacquer on flat surfaces. This is accomplished through the use of 10-in. diameter coating rolls which reduce the angle of departure of the rolls from the work. Variable-speed drive of the 8-in. hard rubber doctor rolls permits them to operate at a slower speed for precision application of the coating film. Long clearance at both ends of the rolls takes the bearings out of range of the coating material, minimizing the possibility of damage to bearings and facilitating cleaning. All adjustments are made by means of handle-type adjusting wheels operating through a screw mechanism.

Drill—Enesay Tool Co., Inc., 756 S. Broadway, Los Angeles 14, Calif., has developed a drill which is said to solve many drilling problems in the field of plastics. In acrylic, the tool drills a frosted hole if drilled dry, a crystal clear hole if a coolant is used. The burnishing effect of the drill design is said to eliminate the spiral scoring which is common in the use of a twist drill. No reaming is necessary. In drilling of phenolic, breaking out and chipping is kept to a minimum.

The Plastiscope*

BY R. L. VAN BOSKIRK

COMMENTS AND INTERPRETATIONS OF THE CURRENT NEWS AND HAPPENINGS IN THE PLASTICS INDUSTRY

Prospects for last quarter of 1947

The slump in the thermoplastics division of the plastics industry since March has been a primary topic of conversation wherever plastics men gather. A majority expect business to pick up in September. Some say September will be 25 percent over August.

The month of May witnessed a severe drop, according to Census Department consumption figures, with a continuation of the downtrend in June. July statistics are expected again to show a decline, which is due more to a normal shut-down period than to a further falling-off in demand.

Summer shut-downs, due partially to vacation periods, are welcomed by the industry, which has not had a breathing spell for the past five years. August figures will probably show that consumption was slightly higher than in July. In September increased operations will be in evidence.

In the thermosetting branch of the industry, published figures indicate a continuous increase in phenolics through June, which was a record month, but operators now report the same signals which preceded the slump in thermoplastics, chief of which is that some of the customers are not taking all the allocation offered to them by producers. Other thermosetting materials continue in good demand, but the entire thermosetting industry has been handicapped by a shortage of raw materials such as formaldehyde, phenol and urea.

Here are the reasons for expecting a gradual rise in business in September:

It is rather generally accepted that 60 percent of all molded and fabricated plastics are sold in the last half of any year. Further, observers point out that the drop in the rate of production in many of the older and more established molding plants was not too severe. Experienced operators claim that business was off no more than 15 percent in that portion of the molding plants normally accounting for 75 percent of business. Decline was more marked in extrusion and fabricating operations.

As for the first-half-year slump, government figures include only the business done by raw materials suppliers, and their business was affected because most processors had built up huge inventories. Some had inventories on hand in January to last them for from six months to a year, in comparison to a normal working inventory of one or two months' supply. Many of them have now used up their surplus and are beginning to give orders for more molding materials.

Contributing further to the first-half-year slump was the fact that department stores stopped buying plastics items on a large scale until they could liquidate stocks purchased in the general hubbub when people were buying anything they could get. It is believed that those stocks were depleted by Labor Day and that department stores are again in the market for high-grade plastics items.

Department stores are currently showing great interest in quality goods: in such fields as toys, kitchen hardware and utensils, picnic ware and dishware.

In industrial uses, manufacturers, after an initial period of hesitancy, seem to be interested in increased use of plastics for such things as washing machine, refrigerator and vacuum cleaner parts, as well as housings for products like electric shavers. They like the color appeal.

According to producers, plastics for packaging in sheet and powder form is also taking greater quantities of plastics.

Another example of a plastic revival is in the button industry, where there have been recent troubles over flammability and cleaning compounds. Those problems are now said to have passed over, temporarily at least.

Thermoplastics competition

The cellulosic-vs.-polystyrene situation continues to attract considerable interest. Cellulosic producers admit that polystyrene will take over a great many items because of its price and, in certain cases, because of its electrical qualities and dimensional stability. On the other hand, they point out that polystyrene has already been in and out of some fields where its brittleness had been a handicap.

However nearly everyone anticipates polystyrene will find big fields where particular advantage can be taken on a volume basis of its price and unique properties. The new higher heat-resistant formulations are also expected to help sales. Its use as sheeting also shows promise.

Some producers are not particularly dismayed over the drop in consumption of cellulose acetate and kindred materials from 8,000,000 lb. last December to a little over 4,000,000 lb. in May, and declare that they expect to be back up to 8,000,000 lb. again by the end of 1947.

Because of its toughness they think cellulose acetate has many useful applications where other plastics will not fit, and that the development of the new slow-burning cellulose acetate for uses in such items as kitchen mixers, vacuum cleaners, electric shavers and lightning arresters will spread rapidly to many other applications. Claims are made that the new cellulose acetate will not support combustion over 30 seconds. Producers point out that they have had a severe time because of the price situation, and that their material is 5 to 10 cents a pound higher than a year ago, but that this condition will not always exist. One of them points out that the price for cotton linters may come down about 4 cents a pound by the end of the year with a possible resultant effect on the cost of plastics.

Formaldehyde

The formaldehyde supply is coming fairly close to meeting requirements in the plastics industry, but only because the materials used with it—phenol and urea—are also short.

Reason for the formaldehyde shortage is the same as it was during the war—a lack of methanol from which it is produced. The low production of methanol is due to a shortage of ammonia made for fertilizer in this country and in Europe. The same facilities can be used for ammonia and methanol, but at present are used largely for ammonia.

Another factor is the great demand for methanol to be used in anti-freeze. Manufacturers are also said to receive a better cash return for methanol used in anti-freeze than they do when selling methanol to be used for formaldehyde.

It is presumed that by some time in the first quarter of 1948 there will be considerably increased quantities of methanol coming to market from additions to present plants and from one or two new companies coming into the business. But even then the increased quantity will be tempered by the increasing demand for anti-freeze.

The principal companies producing formaldehyde at present are: Heyden Chemical Corp.; E. I. du Pont de Nemours & Co., Inc.; and Celanese Chemical Corp. Smaller quantities are made by Cities Service Oil Co., Casein Co. of America and Commercial Solvents Corp.

The Celanese "Chemcel" Plant at Bishop, Texas, which came into major production in the middle of 1946, is already among the foremost producers of formaldehyde, and its production has been helpful in the present situation. Its formaldehyde is produced from petroleum natural gas—propane and butane. Consequently production is not affected by the lack of methanol.

What of polyesters?

A producer of polyester resins recently stated that production of polyesters had dropped from a total of around 6,000,000 lb. in 1944 to less than a 1,500,000-lb. rate at present. The big wartime usage was due largely to radomes and other airplane applications, for which there is now little market. The total 1944 use of all low pressure and contact resins was probably in the neighborhood of 10,000,000 lb., but only part of them were polyesters, according to the producer, who said that most of the polyester resins being produced today

* Reg. U. S. Patent Office.

WE'RE PROUD OF *this* LONG COUNT!

Remember the famous "long count" that made boxing history in 1926? You'll be interested in some of General Industries' plastics molding "long counts", too. They're typical of the way we've been providing, for more than a quarter century, the best in molded plastics to help manufacturers satisfy *their* customers.

For instance, the White Sewing Machine Company of Cleveland, Ohio, first ordered this connector plug from us in 1928. We're still molding connector plugs for White today! That's a "long count" for plastics molding! And an example of the type of dependability that has helped the White Company establish a "long count" for quality, too.

Solve *your* molded plastics problem, too, at lowest possible cost, by calling on General Industries' reliability for long-term satisfaction. Our representative is near you . . . and ready to answer your questions.

DETROIT: Phone Madison 2146
BUFFALO: Phone Grant 8567

THE GENERAL INDUSTRIES CO.
MOLDED PLASTICS PIONEERS
Department PM • Elyria, Ohio

MARION, IND.: Phone 2566-W
CAMDEN: Phone 2215

Plastiscope

are shipped to the West Coast, and that one company had sent as much as 400,000 lb. to that area in 1946.

Total capacity for polyesters is rated at nearly 8,000,000 lb. but it would be a simple matter to convert other facilities.

Our informant asserts that there are less than five large users of polyesters on the Pacific Coast but that there are scores of very small companies who are working on boats and various airplane applications. Their establishment is sometimes no more than a picket fence around a lot, with a tent set up for storage purposes. He claims that boat builders in other parts of the country do not use much of this material, but that Californians like it because they can use sunlight as a catalyst.

This same producer says that the future for polyesters is at least two years away, but admits that there is considerable difference of opinion over his prediction. He thinks that large poundage will become possible only when the big companies start producing for applications which are not substitutes but are actually superior to other materials. Perhaps the vegetable trays shown at the S.P.I. show are a good example. He suggests that the industry quit talking exclusively about table tops, Venetian blinds and wall board. He feels development of the polyester business is still uncertain due to processing or marketing problems.

Another producer says that all of the important high pressure laminators are experimenting with polyesters, but there is no obvious indication that they are getting into the business. Another possibility is the use of polyesters as a casting resin, but producing these resins for casting seems harder than for laminates.

Forticel

Officials of Celanese Plastics Corp. state that Forticel, their new cellulose propionate molding material, is still in pilot-plant production but at a considerable increase over a year ago. As much as 5000 lb. can be supplied to anyone who wants it for testing and experimental purposes, but a continuous supply cannot be guaranteed. Company officials are encouraging its use in applications where it has the greatest future. Ground for the new Forticel plant at Belvidere, N. J., has not yet been broken. Officials are keenly disappointed but point out that their company has several other great projects under way, such as a plant for acetate flake and yarn at Rock Hill, S. C., the Canadian wood-pulp plant, a large expansion program at Newark and the chemical plant in Bishop, Texas, which, although it is now in full production, is still a newcomer. With all this expansion and the difficulty of obtaining building supplies, the Forticel program was temporarily postponed.

Inter-industry competition

The future competition within the plastics industry is illustrated by three items, two of them old timers and one comparatively new where plastics is concerned.

Fountain pens and pencils are one example. Cellulose nitrate has held and, according to interested parties, still holds the lead in this market which it has had since it captured the field from hard rubber many years ago. Over the past few years cellulose acetate and cellulose acetate butyrate have made marked inroads into the fountain-pen-and-mechanical-pencil field. Recently there has been a trend toward other materials, and developers claim that fountain-pen barrels are now being made from ethyl cellulose, propionate, Plexene and acrylics.

Telephone bases are another good example. For many years they have been made from phenolic molding compounds and a visitor from Europe recently reported that thousands of colored urea telephone bases were in evidence over there. In recent years considerable development work has been going on in the use of cellulose acetate butyrate, propionate and ethyl cellulose for this purpose. The latest adoption of a new material called to our attention is a telephone base made of a mixture of phenolic and nitrile rubber compound. The addition of nitrile rubber is said to improve the impact strength so that a phone base may be dropped without fear of breakage.

A newer use of plastics has come with their dip into the phonograph record field. (*Molded vinyl phonograph records*, Modern Plastics; *June 1947, page 107.*) Before the war these records were practically all made of shellac, but in recent years thousands of them have been produced from vinyl chloride copolymers. Polyvinylidene chloride copolymers are reported to be entering the field. A bagasse and phenol combination has been recommended. For several years one of the larger companies has been turning out a combination of ethyl cellulose and vinsol resin as a replacement for the low-cost shellac records, but there has been no commitment to maintain this combination when shellac becomes more available. Another development is an acrylic record which is said to have tested a remarkably high number of play-backs, but tone quality has not yet been thoroughly tested. There is an unusual amount of experimentation going on in this field. Though producers believe that it has great potentialities, it has a past record showing unusual fluctuations.

Beacon tops

The Engineer Research and Development Laboratories at Fort Belvoir, Va., are proud of their new plastic beacon top, according to the "*Belvoir Castle*," camp newspaper. The plastic dome was built at the Model Shop at the ERDL to replace the glass beacon top being used at present. It seems that the glass bubbles are proving too breakable in handling and cannot stand the sudden change of temperature after they have become heated and rain starts to fall. The plastic replacement, besides weighing only about a third as much, does not break in handling and is not affected by changes in temperature.

The publicity has it that the dome is blown with compressed air in one piece in a sleeve mold that keeps the sides of the dome perpendicular but gives a perfectly rounded top. It is said to be the highest one-piece plastic dome ever blown on such a narrow base. They further state that the plastic dome will withstand temperatures of more than 220° F. without melting or distortion; it is free from bubbles and the distortion that mars the optical efficiency of the glass domes; it is virtually shockproof and will withstand considerable abuse in shipping and installation.

Publicity states that the plastic type weighs only 20 lb.—which is 1/3 the weight of the glass domes, and these plastic domes can be obtained at a much lower cost than the glass type.

Vinyl butyral tablecloths

Six major tablecloth manufacturers are using vinyl butyral for a coating to resist stain and soil, according to the Monsanto Chemical Co., which adds that a substantial amount of all current production of cotton-print tablecloths is now coated with its material. Officials assert that coated tablecloths have now been in continuous use for nine months with little sign of wear. One of the leading New York department stores sold 12,000 yd. of yard goods coated with vinyl butyral the first three weeks it was on sale and has since placed weekly re-orders.

1948 Encyclopedia

A listing blank for any firm desiring mention in the Annual Directory of the 1948 Modern Plastics Encyclopedia may be obtained without cost or obligation by writing to the Plastics Catalogue Corp., 122 E. 42nd St., New York City. Directory listings include materials and chemicals, machinery and equipment, machine tools, supplies, specialized services, educational courses in plastics, molders and extruders, fabricators, laminators, consultants, testing laboratories, industrial designers, molders' marks and trade names of plastics materials and processes.

Electrical fixtures

Actual and estimated production of electrical wiring devices, March through June, tabulated from manufacturers' monthly reports, is shown below from statistics provided by the Office of the Housing Expediter:

Devices[a]	*March*[b]	*April*[b]	*May*[c]	*June*[d]
	(in millions of units)			
Toggle switches	5.2	5.4	6.0	6.6
Convenience outlets (receptacles)	5.7	5.7	6.3	6.9
Sockets (lampholders, lamp receptacles, medium screw base)	13.7	14.5	16.7	16.6
Outlet, switch and receptacle boxes	10.9	11.1	11.2	11.1
Box connectors	11.5	13.2	13.8	14.0

[a] Suitable for residential use. [b] Actual. [c] Estimated. [d] Scheduled.

In June almost half of the producers were still working more than 40 hr. a week, and a few more than one shift, with shortages of raw materials such as steel and

Plastiscope

phenolic resin molding compounds still hampering production and leaving all above items except lampholders still short.

Nylon lock nuts

Self-locking nuts, using nylon bonded within the metal nut to grasp the thread of the inserted bolt so tightly that it can not loosen, have been announced by the Elastic Stop Nut Corp. and Nylok Corp. It is said to have higher degree of resiliency than other locking mediums now in use.

Baseball screen only temporary

It turns out that the widely publicized screen in front of the center field bleachers in the Chicago Cubs' Baseball Park, made of cellulose acetate material, was used only to determine whether or not the fans could see through a colored screen. Various colors are being used to test visibility. If successful the baseball club will later install shatterproof glass. Shatterproof glass is deemed necessary in order to withstand the impact from batted baseballs or objects that might be thrown at it.

Increased interest in furfural

Due to a shortage of formaldehyde and perhaps to the expiration of several furfural resin patents, there has been a revived interest in furfural for use in thermosetting resins during the past year.

Early in 1946 the results of intensive research efforts by several major resin suppliers on the use of furfural in the manufacture of phenolic resins began to unfold. The old drawback that phenol-furfural compounds require higher temperature and longer cycles to cure has to a large extent been overcome. In at least one instance a phenol-furfural compound is being produced which is faster curing than competitive resins. In another instance research pointed the way toward the production of a laminating varnish with high strength and excellent electrical properties. A third development resulted in a compound having high heat resistance and greater chemical stability toward corrosive agents. Phenol-formaldehyde may be molded and cured at temperatures of 300° F. and higher. The temperature range in which phenol-furfural cures rapidly is narrower, extending approximately from 330 to 360° F. It does not pass through the rubbery stage, but yields molding resins which flow freely into the desired form and set rapidly into infusability.

Rather than as a competitor to phenol-formaldehyde, phenol-furfural is being recommended as a special material for complex jobs, particularly in the electrical field, where its strength and electrical qualities have met and exceeded N.E.M.A. specifications. Developers feel use of furfural in phenolic resin production may soon total 20,000,000 to 30,000,000 lb. annually.

Several factors prompted resin manufacturers to accept furfural as a desirable raw material. The shortage of phenol was important. Due to its higher molecular weight, furfural permitted the resin manufacturer to stretch his phenol supply. Assuming that phenol reacts with aldehydes in equimolecular proportions, 1 lb. of phenol, reacted with formaldehyde, yields 1.127 lb. of resin; when furfural is used in place of formaldehyde, the yield is 1.83 lb. of resin, an increase of over 60 percent.

Furfuryl alcohol, a derivative of furfural, is also attracting attention as a resin former. A range of useful reaction products with various properties result in reacting furfuryl alcohol with itself or with other raw materials as phenol, urea, melamine, formaldehyde, furfural and ammonium thiocyanate.

The recent announcement regarding the process for making adiponitrile from furfural for nylon production has attracted wide attention.

Furfural has been produced commercially by the Quaker Oats Co. for 25 years. Current furfural capacity—50,000,000 lb. annually—is being expanded in both the Memphis and Cedar Rapids plants to provide adequately for the old and new applications of this chemical. For years furfural has been extensively used in refining lubricating oils, removing color bodies from wood resin, and as a wetting agent in the manufacture of resinoid grinding wheels. During the war 70 percent of the butadiene for the manufacture of synthetic rubber was refined with furfural.

Plywood production

Production of fir plywood for the first half of 1947 was at the rate of nearly 1,600,000,000 sq. ft. a year, according to the Douglas Fir Plywood Association. Current output is ahead of prewar years, considerably greater than a year ago and only slightly under the record of 1,800,000,000 sq. ft. in 1942. A third of the total consists of all-purpose exterior-type panels bonded with waterproof adhesives —six times more than was produced in 1941. New president of the association is Arnold Koutonen of Olympia, Wash., general manager of the Plywood Div. of St. Paul and Tacoma Lumber Co.

Synthetics for leather treating

More than 3,000,000 lb. of acrylic monomer is used annually in producing 6,000,000 lb. of emulsion for leather treating. It is used largely as a vehicle for holding colored pigments on leather. The American Resinous Chemicals Corp. of Peabody, Mass., has developed an acrylic emulsion which gives high wet-rub resistance and decreases the necessity for using lacquer top coats.

Five-year forward march

"Plastics materials' development in the United States will continue its onward march for at least another five years," said Dr. N. N. T. Samaras, director of research for Monsanto Chemical Co.'s Plastics Div., before the Eleventh International Congress of Pure and Applied Chemistry in London last month. Dr. Samaras pointed out the fallacy of the popular belief that the great volume of plastics materials is consumed in molding applications and declared that molding and casting together constitute less than 30 percent of total plastics materials output. He feels future of the industry is tied up with how well they find applications in new fields by combining with older materials.

New section in N.E.M.A.

An Induction and Dielectric Heating Apparatus Section has been formed as a new division of the National Electrical Manufacturers Association. Chairman of the group is Dr. H. B. Osborn, Jr., sales manager of the Tocco Div. of the Ohio Crankshaft Co., Cleveland, Ohio.

RUMORS

The grapevine has been circulating a rumor that U. S. Rubber Co. plans a new luggage development. A new thermoplastic material with high abrasion resistance and a heat distortion point higher than any thermoplastic, is said to be the key material. Supposedly they are to build their own injection machine big enough to handle half a suitcase at one shot. The machine is rumored to be low-cost in comparison to conventional injection machines, due to the use of less metal.

When queried on the authenticity of the above report, U. S. Rubber Co. officials admitted that they were making progress with their luggage material, but categorically denied that they had a thermoplastic molding powder which would withstand 350° F., or that they expected to use an injection press for processing luggage.

The grapevine story is doubtless distorted, but it is no secret that U. S. Rubber Co. is on its way to an outstanding position in the plastics industry.

Recent announcements concerning the company's acquisition of a former war plant in Chicago; indications of expansion at their Mishawaka plant; development of new machine for producing patent plastic on a roll; the use of their es-es resin for applications in the "Train of Tomorrow"; their activity in the polyester field with Vibrin; their interest in the nitrile rubber-vinyl combinations; their wartime adventure as one of the largest producers of Doron plastic armor and their long experience with coating processes—all indicate a degree of interest far more fundamental than mere experimentation.

Glass floss treated or sized with styrene and coated with vinyl to be used for weaving drapes, upholsteries, etc., is said to be well on the way to perfection.

Watch for the September statement of Allied Chemical Co. It contains an important announcement to the plastics industry. Also examine papers that will be read at the American Chemical Society Meeting, Sept. 15 to 19, for unusually important news concerning plastics and chemicals. With the end of their war problems several companies have had time to develop processes and materials that were under cover for several years. The chemical meeting will be the place for

VAN DORN 1 OZ. INJECTION PRESS

Makes Money

WITH PROFITABLE PRODUCTION OF PLASTIC PRODUCTS

Hundreds of different plastic products—ranging from parts for home appliances, electrical equipment and industrial machines, to novelties, jewelry and toys—are profitably molded on the Van Dorn H-200 Press.

Saves Money

WITH LOW ORIGINAL COST AND ECONOMICAL PRODUCTION

The unusually low first cost of the Van Dorn Press—plus the advantages of lower mold cost, quick set-up time, easy operation and efficient production—is real assurance of worth-while savings.

WRITE FOR BULLETIN

which illustrates and describes the Model H-200 Van Dorn Plastics Injection Press and its many applications.

A PRACTICAL PRESS FOR TODAY'S REQUIREMENTS

Buy a Van Dorn Press . . . and save the difference! Requires no big outlay of capital investment . . . but delivers flexibility and productive capacity that meets today's competitive market conditions.

Electrically powered and hydraulically operated for simple, economical, fast operation. Today, more than ever, it will pay you to consider a Van Dorn Press.

ASK US FOR THE FULL FACTS!

THE VAN DORN IRON WORKS CO.

2687 EAST 79TH STREET • CLEVELAND 4, OHIO

Plastiscope

them to announce their achievements, but if not at that time, they will certainly have important announcements in near future.

A large hair brush manufacturing company plans to switch to cellulosic brush backs for a large part of its production, according to a reliable source. Cellulosics have been used in the past but not on so big a scale as is now contemplated. Among the cellulosics' advantages are toughness and resistance to certain chemicals in hair oils.

Boonton Molding Co., well-known custom molders for years, are now reported to be working on their first proprietary item, which will be heavy-duty alpha melamine dishware.

RAW MATERIALS

Monoplex 11 and Monoplex 16, two new plasticizers for polyvinyl chloride and copolymers, have been announced by the Resinous Products & Chemical Co., Philadelphia, Pa. Monoplex 11, with low volatility, is recommended particularly for imparting good low temperature and ultraviolet resistant properties. It is suitable for high pigment loading uses where the retention of flexibility and resistance to abrasion are important. Monoplex 16, a high molecular weight nitrile plasticizer, yields polyvinyl chloride stocks of high heat and ultraviolet stability, permanence, low temperature flexibility and low water sensitivity.

A new series of chemicals, the vinyl ethers, are now in production by Carbide and Carbon Chemicals Corp. at its South Charleston, W. Va., plant. Vinyl ethers are well known in Germany and the subject of much study by American technicians. They are extremely reactive chemically and offer possibilities in chemical syntheses and in polymerization to adhesives and plastic compositions. As adhesives they have been used in surgical tapes and elastic bandage tapes where they have been found to be more stable to light and show better storage stability than rubber. They may also be used in pressure-sensitive adhesives, laminating glass, upholstering, in sealing cellophane and metal foils, and in bonding rubber and other materials to glass. Copolymers of the vinyl ethers have been prepared with vinyl acetate, acrylic esters, acrylonitrile, styrene and many other compounds. They have been used as plasticizers and tackifiers for nitrocellulose and as modifiers for alkyds and polystyrene resins.

JCX, a non-volatile vinyl resin light stabilizer, has been developed by Advance Solvents & Chemical Corp., 245 Fifth Ave., New York 16, N. Y., for the specific purpose of producing resistance to sunlight and moderately good resistance to heat. There are numerous stabilizers on the market to inhibit discoloration and embrittlement by the heat involved in processing, but few have been developed specifically to provide against discoloration caused by exposure to sunlight. For light stability, 3 to 5 percent of this stabilizer as supplied is usually sufficient.

Glyoxal, a new material for the plastics industry, is now offered on a full-scale production basis by Carbide and Carbon Chemicals Corp., 30 East 42nd St., New York City. Enlarged pilot plant production began in September, 1946, to satisfy the demand for the "Sanforset" process. It is considered useful for many of the applications now using formaldehyde. It serves as a modifying agent for hardening and increasing water resistance of animal glues, casein, zein and other proteins. When reacted with compounds such as polyvinyl alcohol it increases resistance to water, and reacts with tetraethylene glycol to form a soft, water-insoluble resin. It is quite stable, and no extraordinary precautions need be taken during storage to prevent corrosion. The specific gravity, 20/20° C. is 1.24–1.28; average weight at 20°C. is 10 lb. per gallon.

Good-rite Resin 50, a high-styrene, low-butadiene copolymer, has been announced by B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, Ohio. It was specifically developed for use as a stiffening agent in the manufacture of synthetic shoesoling and is also recommended for applications such as electrical insulation, protective coatings and for injection molded appliance plugs. As a compounding ingredient for GR-S or natural rubber, it gives increased abrasion resistance, modulus and resistance to cut growth. It may be sheeted on a mill at temperatures of 150 to 225° F. or injection-molded at temperatures of 380 to 440° F. using a 45-sec. molding cycle. Price, ranging from carload quantities down to 50 lb. lots, is from $0.415 to $0.455.

The price for ethyl cellulose flake used in molding materials and lacquers was recently reduced 5 cents a pound by the Hercules Powder Co., Wilmington, Del., and the cost of molding material now hovers in the range between butyrate and propionate. At the same time Hercules announced a reduction of from 10 to 25 percent in their prices of major volume-synthetic resins used in the paint, varnish, lacquer, adhesive and printing-ink industries. Completion of their plants permitting large-scale production in Hopewell, Va., and Burlington, N. J., was a contributing factor to the price reduction.

Consumption of ethyl cellulose molding material has fallen off considerably since last Fall but a large portion is now going into the housings of proximity fuzes for artillery shells. The material's toughness is helping to win for it more widespread adoption for such uses as tool handles, radio cabinets, doll heads, vacuum cleaner parts and refrigerator breaker strips.

Embodying the latest advances in hardwood pulping and capable of producing high grade chemical pulp for rayon and plastics, several pulp mills will be built in the New England area in the near future, according to Dr. Robert Aries, Director of the Northeastern Wood Utilization Council.

Benzonitrile, a versatile chemical intermediate used in the production of synthetic resins, has been made available by the Socony-Vacuum Oil Co., Inc., 26 Broadway, New York City. The pilot plant at Paulsboro, N. J., embodies an application of petroleum technology to the manufacturer of organic chemicals wherein toluene and ammonia are combined chemically in the vapor phase with the assistance of a catalyst. The material is recommended as a solvent where usual solvents are ineffective, as for vinyl resins.

A new polyamide resin is now in production at a rate of approximately 100,000 lb. per month by General Mills, Inc. It is priced at 55 cents a pound, f.o.b. Minneapolis, Minn., and it is available to consumers in solid form as a hot melt compound, hot-melt uncompounded, and a solvent-type uncompounded. According to the manufacturer, the solvent type produces good results on coating paper, foil and other sheet materials, especially when moisture vapor properties are desired and heat sealing is necessary. The seal obtained with the hot-melt type is a tough resin seal with a strong bond.

COMPANIES

Arnold Brilhart, Ltd., Mineola, N. Y., after financial readjustment, made necessary by expansion program, is now operating on "business as usual" schedule.

Confidence in the future of vinyl plastics is indicated in the announcement that Textileather Corp., Toledo, Ohio, is planning a $400,000 expansion program in buildings and equipment "to be in readiness for the contemplated expansion in the use of plastic-coated fabrics."

Engineered Plywood Products Co. has been established at Tacoma, Wash., with David S. Betcone as president. It will specialize in plywood cut to specific sizes and shapes with emphasis on items for railroad car builders, furniture and toy manufacturers, and sign makers.

Calco Machinery Co., 1420 Chestnut St., Philadelphia 2, Pa., has been appointed agent in the Philadelphia territory for Reed-Prentice equipment including injection-molding machines.

The Friedman Co., 220 E. 23rd St., New York City, has been appointed eastern representative for the Process Mold & Manufacturing Co., of Detroit, Mich., fabricators of "pressure cast" beryllium copper cavities and cores for the industry.

The Fairchild Camera and Instrument Corp. have announced a photoelectric engraving machine for newspaper application that produces a 65-screen halftone printing plate on a Celluloid sheet without the necessity of providing the intermediate photographic or chemical

Plastiscope

steps. It is presumed that the machine will find acceptance largely among weekly newspapers because it can make possible the reproducing of a two-to-three-column picture at a price of 37 to 40 cents, compared with much higher cost engravings. In addition to leasing the machine, the Fairchild Corp. will supply the Celluloid plates which are essential to operation of process.

The American Standards Testing Bureau, Inc., 44 Trinity Place, New York City, is a new agency for sampling, testing and certifying materials. It has been organized to permit expansion of the quality control services formerly rendered by Sam Tour & Co., Inc.

Pennsylvania Coal Products Co., Petrolia, Pa., a subsidiary of Koppers, has been made an integral part of the Koppers Co., Inc., Pittsburgh, Pa., and will be under the direction of Dan M. Rugg, vice-president and general manager of the Koppers' Chemical Division. Charles F. Hosford, Jr., president of Pennsylvania Coal Products Co. until its consolidation with Koppers, has been appointed a vice-president in the Koppers' Chemical Div. and will continue as manager of the company's Pennsylvania Coal Products Dept.

The Moldex Rubber & Plastics Corp. 1 E. 57th St., New York City, has acquired a new factory at 430 E. Allegheny Ave., Philadelphia 34, Pa., for the production of molded and extruded rubber products and production of compression molded phenolic.

The new Hiawatha trains of the Chicago, Milwaukee and St. Paul Railroad are using more decorative laminate than ever before employed on a railroad car, according to D. J. O'Conor, president of Formica Insulation Co., Cincinnati, Ohio, who said that his company's insulated panels were being used as wainscot, side walls, bottom surfaces of upper berths, and headboards in coaches and sleepers.

Formica has added a new slitting machine and two new coating machines which will be used to accelerate their laminating processes for wide widths of paper.

Tewes-Roedel Plastics Corp., specializing in fabrication of sheets, rods and tubes, has been formed at Waukesha, Wis., with Donald E. Tewes as general manager and George F. Roedel serving as technical engineer.

The Pantasote Co., Passaic, N. J., has installed a new type Ionotron static eliminator which helps neutralize fire hazards. In coating operations static electricity is a constant problem as the product moves through the machines, for a spark can ignite vapors of the volatile solvents used. The eliminator prevents build-up and discharge of static near the lacquer reservoir, which has in the past become ignited through discharges of static. The Ionotron is a product of U. S. Radium Corp., 535 Pearl St., New York City 7.

The Mica Insulator Co. has established additional production facilities at Schenectady, N. Y., for splitting, punching, cutting and processing of condenser films, vacuum tube supports, heating elements, etc., from mica insulation.

The Flexible Plastic Coatings Dept. of Interchemical Corp., 57-59 State St., Newark 2, N. J., has been created to offer the experience of specialists in the coating and decoration of paper, textiles, plastics, rubber, metal foils and leather. Compounds for continuous film coating, flocking compositions and adhesives are available. Chester M. Robbins is sales manager of the new department.

Farrel-Birmingham Co., Inc., Ansonia, Conn., has made an arrangement with John Bertram and Sons Co., Ltd., Dundas, Ontario, Canada, by which the former's processing equipment for the manufacture of rubber and plastics, phonograph record machinery and hydraulic machinery will be built in Canada.

Laminated and chemically hardened channel boxes and angles in lengths up to 20 ft. are now in production for packing and crating materials by the Laminite Products Div. of the Criterion Paper Corp., 799 Washington St., New York City. The company states that they are comparable to wood in strength and durability but less than half the tare weight, and are recommended for shipping metal, plastic and glass tubes, rods, bars and moldings; textiles; and rubber products. The Laminite is slow-burning and water-resistant, with a moisture content of approximately 10 percent. The plant is at Wassaic, N. Y., and two similar plants are planned for the midwest and south.

Engineering Associates, Inc., of St. Charles, Ill., has developed a product named "C-ALL," a glass cleaning, antifogging agent for use on eyeglasses, automobile windshields, windows and other glass surfaces. The formulation includes a silicone-type resin and glass cleaning agent preventing fog formation for a long time.

Plasticote Fabrics Corp., Paterson, N. J., has a new type of coated fabric employing a vinyl chloride copolymer which has a dull finish that takes it out of the coated look category and makes it desirable for tablecloths and similar merchandise. Among manufacturers now selling this coated tablecloth are W. E. Thomas Corp. and A. R. Rosenthal Co., Inc., both of New York City.

Peerless Products is newly located at 812 N. Pulaski Rd., Chicago 51, Ill.

Swift & Co. has changed the name of its "glue department" to the General Adhesive Products Dept., in order to more correctly encompass their activities in the adhesives business. Originally manufacturers of hide and bone glue only, the company now uses raw materials of all types to make one or more grades of adhesive.

The new Marietta processing plant of the B. F. Goodrich Co., which is to begin operations in a few weeks, will have Robert Price as manager of the Development Dept., for the Plastics Division. He has been manager of a similar division at the Akron plant for the last two years.

Monsanto Chemical Co. moved its New York offices to 445 Park Ave. in August.

Plexon, Inc., has moved to new quarters at 419 Fourth Ave., New York City.

Merritt Engineering and Sales Co., Inc., has been renamed Merritt-Monsanto Corp. Manufacturers of veneer and plywood-making machinery, the firm became a part of Monsanto Chemical Co. in 1944.

The Keyes Fibre Co. has purchased the capital stock of John M. Hart Co., Inc., its sales agent, which will now operate under the name of Keyes Fibre Sales Corp. Communications should continue to be addressed to the office at 420 Lexington Ave., New York City.

FINANCIAL NEWS

Monsanto Chemical Co.'s sales during the six months ended June 30, 1947, amounted to $71,085,736, an increase of 41 percent over the corresponding period in 1946. Net income for this period was $9,275,133, which is equivalent to $2.23 each on common shares. Earnings of the corresponding six months of 1946 were $6,185,234 or $1.48 a common share. Edgar M. Queeny, chairman of the board, said that excellent progress was being made at Texas City on reconstruction following the April disaster, and that clearing of the site has almost been completed.

Hercules Powder Co. reports earnings of $7,312,900 for the six months ending June 30, 1947. Earnings are equal to $2.69 on common shares. Earnings for first six months of 1946 were $3,629,885 or $1.30 a share. Sales for the six-month period were $69,067,028, compared with $47,050,408 for the corresponding 1946 period.

The St. Regis Paper Co. reports sales for the first six months of 1947 of $69,033,514 as compared with sales of $35,336,923 during the same period last year. Net earnings for the first half of this year amounted to $7,696,147 as compared with net earnings of $5,563,603 for the entire year of 1946. Among its specialties St. Regis names Panelyte, a lightweight laminated plastic, as having proved of value in such fields as mechanical refrigerators, radios and airplanes. Decorative Panelyte is used for bar tops, table tops and other decorating purposes. St. Regis now operates 43 plants and mills in the United States and 3 in Canada.

E. I. du Pont de Nemours & Co., Inc., was owned by 91,538 stockholders on June 30, 1947. The company announced that earnings for the six months ending in June equalled $5.13 a common

Plastiscope

share compared with $4.67 earned in the first half of 1946. Net income for the period ending June 30, 1947, was $61,619,650 in comparison to $55,731,895 for the similar period in 1946. Sales increased to $378,671,184 from $307,852,718 in the first half of 1946.

Union Carbide & Carbon Corp. reported consolidated net income for the first six months of this year at $36,071,419, or $3.85 a share, while earnings for the corresponding period in 1946 were $24,657,976, or $2.65 a share. The first quarter payment on shares for 1947 was $2.04 a share in comparison to the second quarter payment of $1.80 per share.

The financial reports of five plastics manufacturing companies have been cited for excellence in the seventh annual report survey conducted by "Financial World," a weekly magazine: Catalin Corp. of America, Continental-Diamond Fibre Co., Drackett Co., Minnesota Mining & Manufacturing Co., and National Vulcanized Fibre Co. One of these companies will be awarded the bronze "Oscar of Industry" trophy for the plastics industry at a banquet in New York on October 10. Last year the trophy was won by the Drackett Co.

PERSONAL

Fred Conley, founder and first president of S.P.E., has become the Detroit representative of International Molded Plastics, Inc., of Cleveland, Ohio. His address is Stephenson Bldg., Detroit, Mich.

James L. Rodgers, Jr., has resigned as vice-president of Libbey-Owens-Ford Glass Co. and as general manager of its Plaskon Div. He will be succeeded as general manager by William W. Knight, Jr., who has been assistant to D. H. Goodwillie, executive vice-president of the parent company.

J. D. Shaw is in charge of the new Ammonia Department of E. I. du Pont de Nemours & Co., Inc., to specialize in service to the plastics, adhesives and wood industries.

Robert G. Metzler, former product supervisor for cellulose acetate with Hercules Powder Co. of Wilmington, Del., has joined Hagan-Whytte Co. of Detroit, luggage manufacturers who are producing a line of cellulosic laminated carrying cases.

Harold Robbins is the new manager of United States Plywood Corp.'s Brooklyn branch, succeeding E. B. Creigh, who will resume activities in the company's New York City offices, at 55 W. 44th St.

Dr. Dorothea E. Klemme of the Naval Ordnance Laboratory's Plastics Division, is one of their few feminine scientists. She is working in research problems on the fungus- and moisture-proofing of ordnance equipment, with special emphasis on plastics, laminates, fabrics, lacquers, varnishes and similar materials. Dr. Klemme is a native of Boulder, Colo., and has collaborated on several scientific articles on fungi.

Robert B. Frank has been made sales manager of the Little Rock, Ark., Div. of the Visking Corp. Mr. Frank has been previously engaged in the development of Viskon, a non-woven fabric used in laminating and for plastic coating. A new plant is now in operation at Little Rock for the manufacture of Viskon.

W. I. Galliher has been appointed executive sales manager of the Columbia Chemical Div. of the Pittsburgh Plate Glass Co. and the Southern Alkali Corp. He has been with Columbia Chemical since 1931.

Joseph Silvers has resigned the presidency of Synthetic Plastics, Inc., to establish a new concern with his son under the firm name of Joseph Silvers & Son, Inc., 229 W. 36th St., New York City. They will manufacture plastics buttons, buckles and novelties.

Frederick J. Riker, formerly of Crucible Steel Co. of America, has been named president of Livingstone Engineering Co., electric steam boiler manufacturers, of 120 Milk St., Boston 9, Mass.

Andrew P. Dunlop has been appointed assistant director of chemical research for the Quaker Oats Co., where, for 16 years, he has worked on the development of furfuryl alcohol, furoic acid and furfural.

T. F. Montgomery has been named head of the Engineering Section of the Plastics and Chemicals Div., the Glenn L. Martin Co. at Painesville, Ohio. For the last nine years he has been with the Chemicals Plant Div. of Blaw-Knox Construction Co. of Pittsburgh, Pa.

Wilson A. McCall has been elected vice-president and treasurer of the Applied Resins Corp., manufacturers of plastic castings, at 304 Oraton St., Newark.

John D. Brown has been named manager of the Central Sales District for the Technical Products Div., Corning Glass Works, with offices in Chicago, Ill.

Dimitry S. Troubs has been named coordinator of the manufacturing operations of Industrial Chemical Sales Div. of West Virginia Pulp and Paper Co. Its products include active carbon, calcium carbonate, tall oil, chlorine, lignin, terpenes. Mr. Troubs graduated from the Imperial Russian Naval Academy in 1912 and came to America during the first World War as a technical assistant to the United States Navy.

J. Warren Kinsman, general manager of E. I. du Pont de Nemours & Co., Inc.'s Fabrics and Finishes Dept., has been made vice-president and member of the executive committee, to succeed Willis F. Harrington, retired. Mr. Kinsman was first employed by du Pont in 1915, and has worked in the High Explosives, Dyestuffs, and Organic Chemicals Depts. In 1944 he became the general manager of the Fabrics and Finishes Dept. Mr. Harrington originally joined the company as a chemist in 1904, became director of the Dyestuffs Dept. in 1921 and was designated a vice-president in 1929.

Richard D. Dunlop has been placed in charge of research and development of Monsanto Chemical Co.'s Texas Div. with headquarters at Texas City.

SPI News: D. A. Rothrock, Rohm & Haas Co., is now chairman of Philadelphia Chapter, with Paul J. Every of Baldwin Locomotive Works as vice-chairman, John A. Okie, of Corasdale & de Angelis, as secretary and J. Frank Motson, J. Frank Motson Co., as treasurer. J. D. Crosby of the Plastics Div. of Hood Rubber Co., has been named president of the Boston-Providence Chapter. Claude A. Lotarte, Plastic Turning Co., is the new chairman of the Worcester-Leominster-Fitchburg Chapter. William H. Nausbaum, Columbia Protektosite Co., has been reelected chairman of the S.P.I. Executive Accounting Committee. Alfred C. Manovill, Ideal Plastics Corp., has been elected chairman of the Button Div. of S.P.I. George Gress of Lyon, Inc., Detroit, Mich., is the new chairman of the S.P.I. Extruders Division.

Deceased

Frank P. Welch, of E. I. du Pont de Nemours & Co., Inc., June 24.
John Hohl of Newark Die Co., Aug. 4.

MEETINGS

Sept. 14, 15 and 16—Plastics Pioneers, Shawnee Inn, Shawnee-on-Delaware, Pa.

Sept. 15 to 19—American Chemical Society Meeting, New York, will include sessions on fluorine chemistry, recent developments in plastics, a high polymer forum. Plastics Division will meet at Hotel New Yorker. Priestley Medal will be presented to Professor Warren K. Lewis of the Massachusetts Institute of Technology.

Sept. 19—Northeastern Wood Utilization Council, New Haven, Conn., Conference on lignin chemistry. Applications will be open to interested persons who seek invitations by writing E. L. Heermance, Northeastern Wood Utilization Council, P. O. Box 1577, New Haven 6, Conn.

October 21–25—Pacific Chemical Exposition, San Francisco, Calif. There will be papers on Thiokol, Perbunan and butyl, silicone resins, and the western plastics industry.

December 1 to 6—Chemical Industries Exposition at Grand Central Palace, New York City.

December 3—American Society of Mechanical Engineers, Atlantic City, N. J. Henry Ford II will be the guest speaker at the dinner.

Feb. 16 and 17—S.P.I. of Canada at Mt. Royal Hotel, Montreal.

Employee education

SINCE "you can't inspire a machine," a threefold employee education program has recently been inaugurated by the Standard Molding Corp. of Dayton, Ohio, and is stimulating much interest throughout the plastics industry.

The aims of the company, which is engaged almost entirely in custom injection molding of thermoplastics, are: 1) To build up the interest and morale of younger employees so as to have better "back-stops" on the production line. 2) To improve employee knowledge of materials handled and to stress the importance of their work in connection with quantity production, and prevention of waste. 3) To improve the company's public relations through employee education.

Classes held once a month

This program, consisting of monthly classes, is not designed to instigate a speedup. Attendance is compulsory only for foremen and lead hands. However, every employee is encouraged to attend and, since the classes take place on company time, is paid for doing so.

Four classes have been held to date, each lasting about 1 hr. and 45 min. Half of the period is devoted to lectures, the other half to discussion of problems on current jobs. Lecturers are men not connected with the company. This, management feels, leads to better attendance than if company executives lectured, and brings independent authority to statements about materials and methods.

The earlier classes are being devoted to talks and demonstrations on polystyrene, cellulose acetate, cellulose acetate butyrate, ethyl cellulose and molded vinyl. Cost of materials in relation to finished production cost and the importance of preventing waste is stressed. At a recent class, a drum of virgin material was compared with a drum of scrap, providing dramatic proof of the high cost of waste to customers, to management and to employees. Later classes will deal with finishing methods, cementing, polishing and inspection.

Guide for promotions

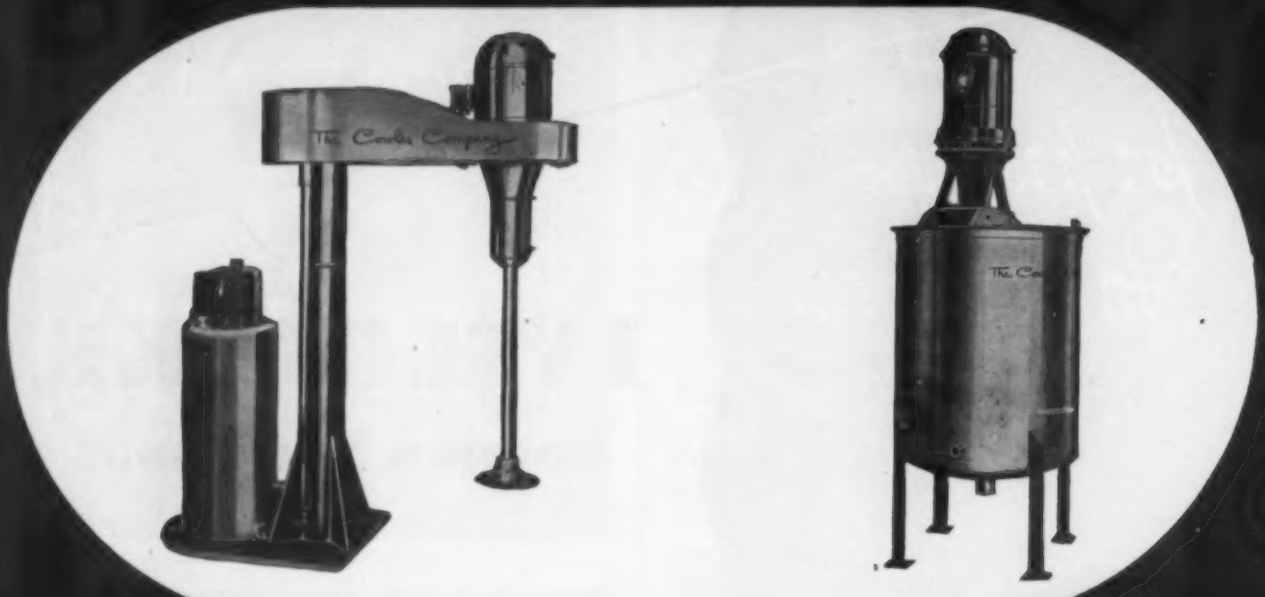
No formal examinations are planned but every six months a questionnaire will be issued to find what the employees have learned and to give management an idea of subjects which employees would like discussed. Not only will the questionnaire stimulate suggestions but it will be used as a rough guide to determine which workers are displaying the greatest interest with a view to promoting them. It can only be a partial indicator because some people naturally write more articulately than others, but its efficiency in this regard is expected to improve as the classes continue.

Attendance and interest at the Standard plant so far has been high. Company officials hope to open the classes to employees of other molding companies in Dayton in the near future.

New MOLECULAR Scrubbing Action

DISSOLVES DISPERSES

From 25 MINUTES to 10½ HOURS *Faster*



COWLES DISSOLVER

A high-speed machine that develops high-velocity interface shear

Turning at a rate of speed that dissolves or disperses from two to twenty times faster than the conventional mixer, the impeller of the Cowles Dissolver is scientifically designed to set up components of laminar flow. Each lamina, moving at a different rate of speed from its neighbors, creates interface shear between surfaces of molecular thickness. The multiple surfaces and high velocity gradients of these laminae subject every particle of the materials being treated to molecular tension and scrubbing, greatly accelerating the dissolving or dispersing action. Undissolved residues are held to low levels and more homogeneous mixtures are produced. Splash and dead spots are eliminated. Turbulence and aeration are held at low levels, though controlled aeration can be had if desired.

Safe, Silent, Long-Wearing

Sound design and rugged structure . . . plus finely machined materials of high physical properties . . . all assure maximum life with minimum maintenance requirements. A high degree of static and dynamic balance has been achieved in the rotating parts, eliminating noise, vibration.

Models With or Without Tanks

In two models—with built-in tanks in capacities of 100 gallons, 250 gallons and 500 gallons, or for use in tanks brought to the machine. Motor speed and horsepower adjusted to the need. Explosion-proof motors on special order. Write for descriptive folder, or ask for a technical representative to call.

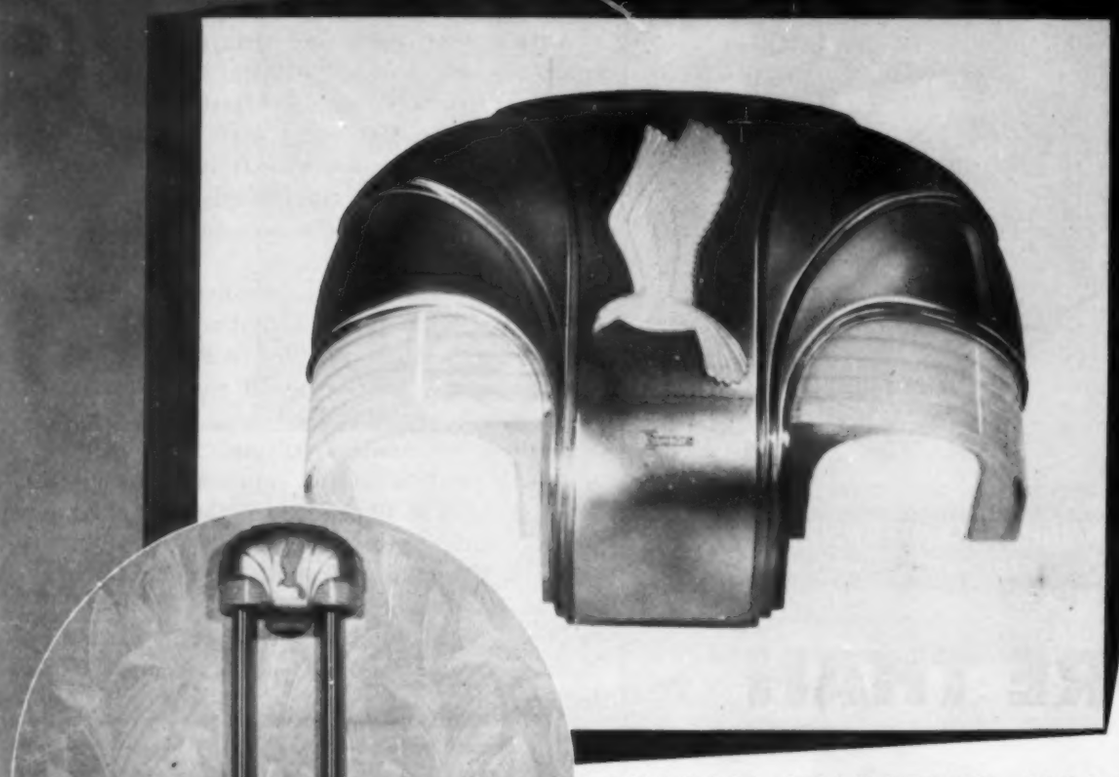
5 Years of Commercial Test Show Cowles Dissolver Up to 10½ Hours Faster on Typical Operations

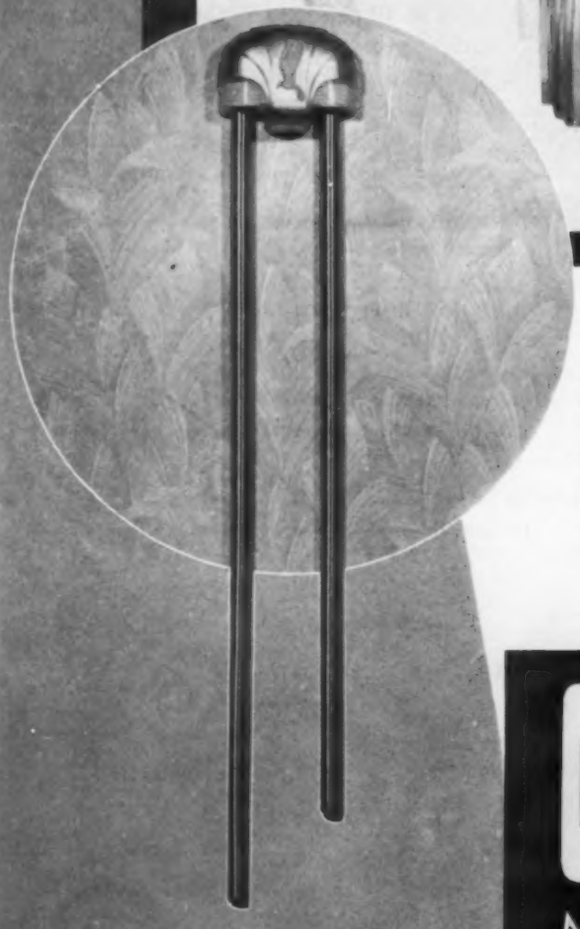
Type Operation	*Material*	*Cowles Dissolver*	*Standard Mixer*
Gum Cutting	Rosin	1½ Hrs.	12 Hrs.
Synthetic resin dissolving	Vinylite	1 Hr.	6 Hrs.
N/C solution	Nitrocellulose	12 Min.	90 Min.
Tinting	Enamel	5 Min.	30 Min.
Pigment dispersion	Heavy enamel	6 Min.	150 Min.
Coating suspension	H. T. Clay	1 Hr.	9 Hrs.

The Cowles Company
INCORPORATED

Cayuga, N. Y. *Associate: Alexander Fleck, Ltd., Ottawa, Ont.*

PLASTICS for INDUSTRY





CUSTOM INJECTION MOLDING

For many years the Edwards Company of Norwalk, Connecticut, used metal chime shields for their line of home chimes. Today plastic is replacing the metal housings previously used. Through the use of the Cruver bas-relief decorative process a clear casting is decorated in two colors—Ivory and Brass—and through final engraving reproduces in great detail the design and style so necessary in today's competitive market. If you are thinking of converting present models to plastic or entering into a new field, check with Cruver and avail yourself of our 51 years of experience.

CRUVER CHICAGO

51st Year in Plastics . .

Cruver

MANUFACTURING COMPANY

2456 W. Jackson Blvd., Chicago, Ill., Seeley 1300

New York – 2 W. 46th St. • Wisconsin 7-8847

Acrylate polymers (Part II)

(*Continued from page 129*) ening agent. It was sold to the textile industry in Germany under the tradename of Appretan C.

Solution polymers

The chief solvents used in the solution polymerization process were ethyl acetate, benzene and toluene. Polymethyl acrylate solutions were used largely for making lacquers and as an interlayer for a safety glass; it was plasticized with 20 percent of dibutyl phthalate for this latter purpose. Polyethyl and polybutyl acrylates (50 to 150 parts) were used with cellulose nitrate (100 parts) for aircraft coatings. A special lacquer grade of polyethyl acrylate was made as a 50 percent solution in ethyl acetate and had a K-value of 50.

Polybutyl acrylate solution polymers were prepared as a 20 percent solution in ethyl acetate (K-value 60), 50 percent solution in ethyl acetate (K-value 50), and 30 percent solution in 70 parts acetone and 30 parts benzene (K-value 80).

Acronal 500 solution polymers were made of the same composition as the emulsion polymers. They were produced as 40 percent solutions in ethyl acetate and benzene, respectively; their K-values were in the range of 55 to 60. Acronal 700 solution polymer was used as a coating on metals.

The Acronal solutions dry to pliable rubberlike films. The cold resistance of films 0.5 mm. thick is as follows:

Acronal type	Brittle temperature °C.
I	8
II	−15
IV	−35
500	−15

(*Please turn to next page*)

Ruins of buildings at the I. G. Ludwigshafen plant used for acrylic monomer and polymer production

A view of what remains of the phthalate plasticizer plant adjacent to the acrylic monomer unit. This ruin is typical of many German chemical plants

Acronals IV and 500 have the best resistance to water. Acronals I, II and 500 are suitable for the production of artificial leather, oilcloth and coated materials of all kinds. Since they are made without emulsifiers, they are satisfactory for raincoat manufacture. These two materials are also put to very good use as sizing materials in the textile industry and as adhesives.

An artificial leather was made by Rohm & Haas Co. to the extent of about 50 tons monthly in the early part of the war by casting films 0.6 to 0.7 mm. thick from a 40 percent solution of seven parts polyethyl acrylate and three parts cellulose tripropionate. The solvent used was composed of equal parts of acetone, benzene and ethyl alcohol. The films were reported on good authority to be highly flexible and very durable; they were employed to a considerable extent for high quality book bindings.

Solid polymers

The Acronal resins are easily soluble in esters, ketones, benzene and chlorinated hydrocarbons. Solubility in alcohols is limited. Acronals I and II are not soluble in aliphatic hydrocarbons and mineral oils; these chemicals cause Acronal IV to swell. Their chief uses were as compounding ingredients for lacquers, pressure-sensitive adhesive tapes, cable coverings, and as plasticizers for both polyisobutylene rubber and synthetic rubbers.

Polyvinyl carbazole

(*Continued from page 132*) mineral oils, transformer oils, castor oil, carbon tetrachloride, ether, alcohol, water, dilute alkalies and acids, hydrogen fluoride, and aliphatic and hydroaromatic hydrocarbons in general. It is dissolved or attacked by concentrated nitric acid, concentrated sulfuric acid, benzene, toluene, chlorobenzene, methylene or ethylene dichloride, aromatic hydrocarbons, chlorinated hydrocarbons and halogenated aliphatic solvents.

Compression molding

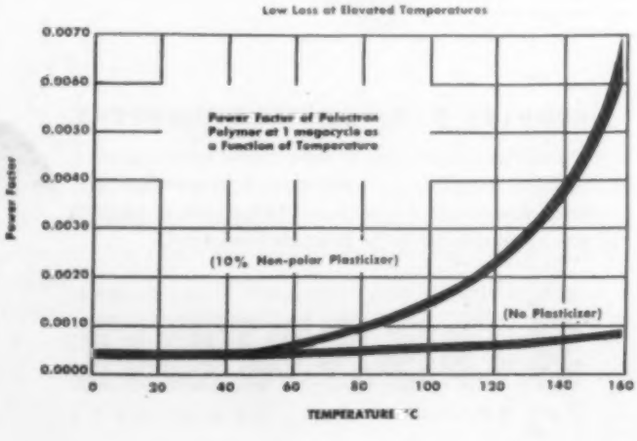
In general, the molding temperature is dependent upon the degree of plasticization which in turn directly affects the heat distortion point of the molded piece, as shown in Fig. 9. Here it is seen that a convenient method of roughly ascertaining the correct molding temperature would be to determine the "adhesion temperature" of the composition, which is the transition point at which the change from the solid to the plastic state occurs.

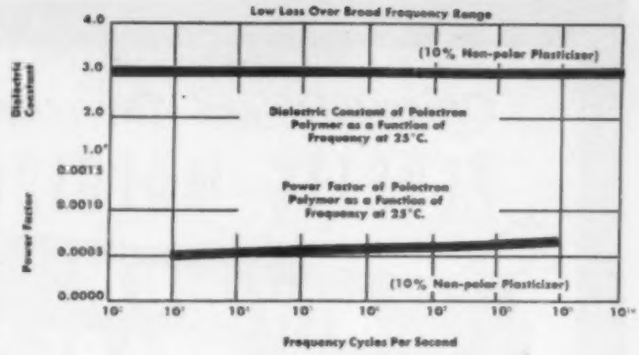
Although the following conditions are not necessarily the optimum molding cycle, they may be used satisfactorily for laboratory compression molding: 10 min. heating period and a 10 min. molding period at 200 to 255° C. under a pressure of 1000 to 4000 p.s.i., with subsequent cooling to 125 to 150° C. under a pressure of 1000 to 4000 p.s.i., followed by ejection of the piece.

It should be noted here that a brittle piece is obtained when Polectron polymer is molded. The addition of a non-polar plasticizer enables one to use a lower molding temperature, although there is no improvement in the physical strength of the molded piece. The following plasticizers may be used to achieve this purpose: HB-40 (Monsanto), diphenyls, terphenyls, amyl naphthalene and phenanthrene, as well as mechanical mixtures containing electrical grade resins such as polystyrene.

The use of a compression molding composition containing Polectron polymer in a fibrous state will im-

7—This graph shows the power factor of material as a function of temperature





8—This graph shows the power factor and dielectric constant as a function of frequency

prove the inherent brittleness of the material so as to give a molded piece which can be machined. The polymer may be fibered by extrusion through a small orifice under pressure at a temperature in the vicinity of 260 to 280° C. at which the polymer is in the proper plastic state to allow a subsequent stretching operation. By this process, orientation of the polyvinyl carbazole chains occurs with the result of increased strength in that direction parallel to the fiber axis.

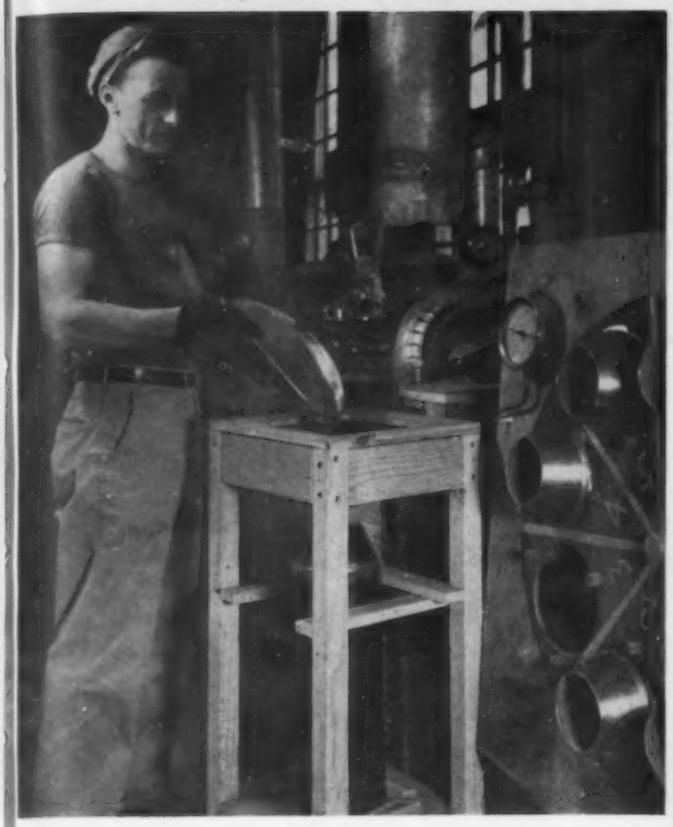
Fillers such as mica, glass fibers and alkaline earth metal titanates may be used to provide special properties at the expense of the electrical properties of the molded piece, particularly after water immersion. For example, the dielectric constant of a composition containing titanates may be as high as 15, but with a marked increase in the brittleness of the molded piece.

Injection molding

Polectron polymer may be injection molded at 220 to 290° C. at pressures varying from 10,000 to 35,000 p.s.i. to give pieces having better physical strengths than those obtained by compression methods. During the injection molding of Polectron polymer, a fibrous structure may develop to a varying degree. Hence, the temperatures here as well as those employed in the compression molding of fibrous compositions must be carefully controlled. If they are too high, a complete relaxation of the fibers occurs with a marked loss in mechanical strength. If they are too low, a porous material with poor water resistance is obtained.

Applications

The trend in the design of radio, radar and other electronic equipment has been toward more compact units operating at higher ambient temperatures as well as increasingly higher frequencies. This trend has reached the stage where, in many cases, the limiting factor in the design of the equipment has been the inability of the highest quality dielectrics to withstand the conditions imposed upon them. The electronics engineer will find Polectron polymer a very interesting material for use in applications where mechanical strength is not of primary importance. Due to its excellent electrical properties, which are retained even at elevated temperatures, and over a wide frequency



Formula failure does not occur when compounding is done in the above manner. Mack Molding Co., Little Falls, N. J.

EXACT WEIGHT weighing for Perfect Ingredient Compounding

Formula failure is by far the greatest reason for rejections in finished molds. High numbers of rejections are not only expensive but largely unnecessary. The answer is better ingredient compounding and nothing will improve compounding more than strict adherence to accuracy in weighing these ingredients. Insist upon fraction-ounce accuracy too. EXACT WEIGHT Scales will stop rejection losses in a much larger degree than you imagine, simply because they apply controls where rejections start—Compounding. This in turn makes for more uniformity in plastic products . . . makes the work easier . . . and lastly, far more profitable. If you use colors EXACT WEIGHT has equipment for color blending too. There are models for fast checking of finished molds. Write for information covering all of them, no obligation of course.

Sales & Service from Coast to Coast

INDUSTRIAL PRECISION

Exact Weight Scales

THE EXACT WEIGHT SCALE COMPANY

650 W. FIFTH AVE. COLUMBUS 12, OHIO

Dept. AC, 783 Yonge St. Toronto 5, Canada

FLAT OR ROUND...

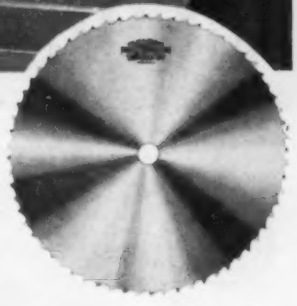
SHEETS OR BARS...

CUT THEM WITH

ATKINS

"Silver Steel"

CIRCULAR SAWS



Save both time and money, as many leading plastic users are doing, by using Atkins "Silver Steel" Circular Saws. These precision-built saws have proved themselves superior on every count . . . cleaner, cooler, longer cutting . . . speed, smoothness, economy.

Also, you have less finishing to do on plastics cut with Atkins Silver Steel saws. Cuts are uniformly smoother. And the famous "Silver Steel" gives the teeth an extra sharpness that lasts to give you longer cutting periods. Change to Atkins "Silver Steel" Saws . . . they give you greater speed and feed . . . push up production, lower costs.

AAA TRADE MARK ATKINS "ATKINS ALWAYS AHEAD"

E. C. ATKINS AND COMPANY

Home Office and Factory: 402 S. Illinois St., Indianapolis 9, Ind.

Branch Factory: Portland, Oregon

Branch Offices: Atlanta • Chicago • Memphis
New Orleans • New York • San Francisco

range, as well as its high heat distortion temperature Polectron polymer may enable the engineer to continue his progress toward more efficient, less expensive and more stable equipment.

Consideration of the following uses of Polectron polymer should be of interest to the prospective user:

1. Structural components for low loss electrical assemblies requiring a high heat distortion point can be compression or injection molded.

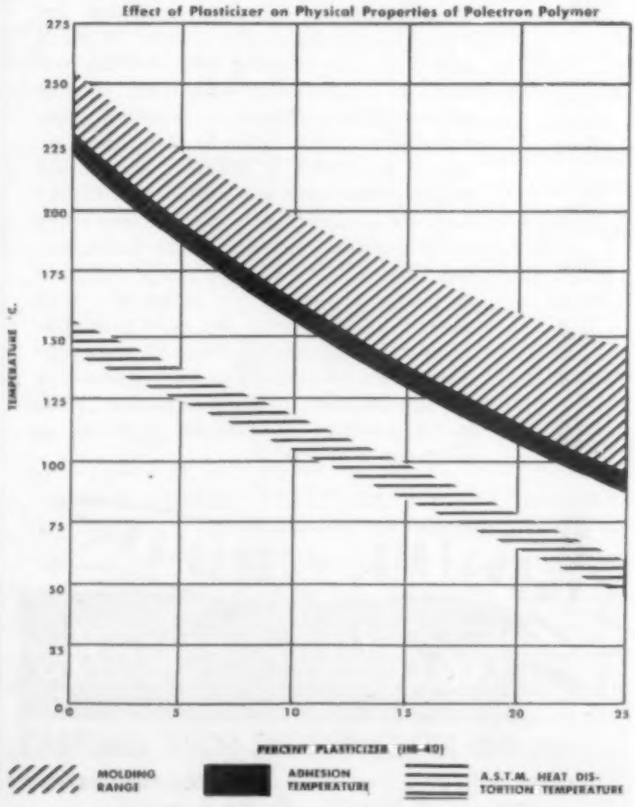
2. When suitably modified, Polectron polymer can be dissolved in specific solvents to be used as impregnants or coatings. Such an application is the use of the benzene solution of a resin composition to impregnate glass cloth with subsequent molding to give a laminated panel.

3. Polectron polymer in the form of a dope can be used in various applications. Typical compositions which have been employed are shown below:

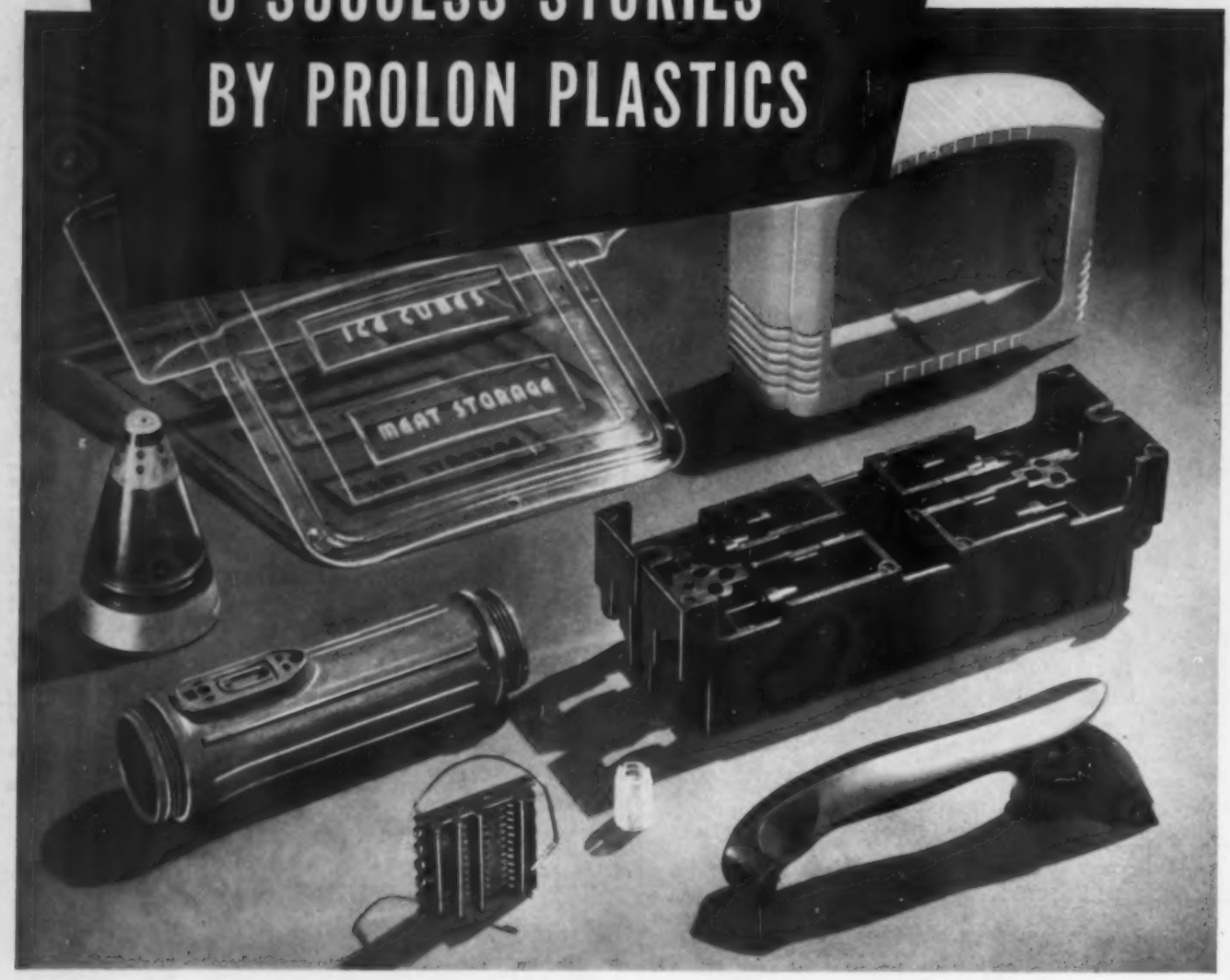
	Materials	*Parts by weight*
a.	Polectron polymer	17
	HB-40	20
	Toluene	63
b.	Polectron polymer	13.5
	Methylene chloride	32.0
	Ethylene chloride	29.0
	Toluene	19.0
	HB-40	6.5

4. Both low loss sheet insulation and low loss tubing can be obtained by the impregnation of paper, cotton, silk, glass and other fibrous materials with a solution of Polectron polymer. These products are capable of withstanding high ambient temperatures.

9—Graph shows high heat distortion point of material



8 SUCCESS STORIES BY PROLON PLASTICS



● Prolon Plastics Custom molding service emphasizes scientific production control. Whether the part be a compression molded flatiron handle or an injection molded flashlight case, Prolon Plastics has the production know-how to do the job. Pictured above are eight examples of molding to exacting requirements. The customers profited by Prolon's high standards of quality.

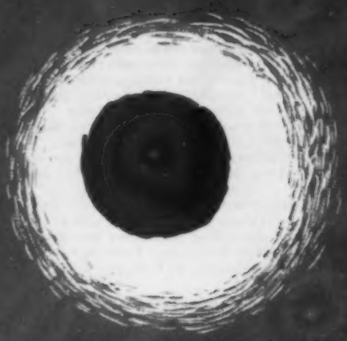
FOR BETTER QUALITY, BETTER SERVICE, WRITE TO

PROLON PLASTICS

A DIVISION OF

PRO-PHY-LAC-TIC BRUSH CO., FLORENCE, MASS.

RESEARCH ★ DEVELOPMENT
DIE-MAKING ★ COMPRESSION
AND INJECTION MOLDING

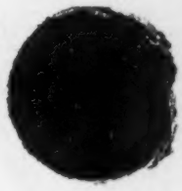


SUPERCARBOVAR

Cabot's Supercarbovar effects a saving for the black plastics manufacturer in two ways. First, the cost is low. Next, it is possible to attain the desired blackness with smaller amounts of pigment. For optimum jetness at minimum cost the carbon black required is Cabot's Supercarbovar.

CABOT

GODFREY L. CABOT, INC., 77 FRANKLIN STREET, BOSTON 10, MASS.



INCREASE BLACKNESS • INCREASE BLACKNESS • INCREASE BLACKNESS • INCREASE BLACKNESS

All classified advertising payable in advance of publication. Minimum, $5.00 (up to 40 words); in border, $10.00 per inch

Classified Advertisements

For further information address *Classified Advertising Dept.* MODERN PLASTICS 122 East 42nd St., New York 17, N. Y.

FOR SALE: Stokes type 200 Automatic Molding Press; Stokes Rotary Preform Tablet Machines 1¹/₁₆", 1¼", 1" & ⅝"; Injection Molding Machines 2 oz. to 12 oz.; Baker Perkins jacketed Mixers 100, 20 & 9 gals. capacity; New Rotary Cutters—Rubber Mills, Calenders, Bambury Mixers, etc. HPM 500 ton Mold. Presses 42" x 48"; D.&B. 500 tons 42" x 48"; Adamson 400 ton 27" x 24"; 20" x 20"; also 20 to 250 tons from 36" x 36" to 12" x 12"; 40 ton Broaching Press; Watson-Stillman Hor. 4 Plgr. 1" x 2" x 4" H. & L. Pressure Pumps; HPM 1¹/₂" x 6" vertical triplex 10 GPM 2700 lbs.; 7 Hydr. Oil Pumps, Vickers, Oil gear, Northern, etc.; Elmes 1" x 4" & 1¼" x 4" hor. 4 plgr. 5 to 8 GPM 4500 lbs. & 5500 lbs.; Rumsey 4½" x 8" vert. Triplex 65 GPM 900 lbs.; Elmes 2½" x 4" hor. 2 plgr., 17 GPM 850 lbs.; New Vickers 1¼" Oil Relief Valves; New Vickers ¾" Flow Control Valves; Hydr. Steam Pumps; Low Pressure Pumps 150 to 600 lbs.; Hydr. Accum.; Heavy duty Mixers; Grinders; Pulverizers; Gas Boilers; etc. PARTIAL LISTING. WE BUY YOUR USED MACHINERY. STEIN EQUIPMENT CO., 90 WEST ST., NEW YORK 6, N. Y. WORTH 2-5745.

HYDRAULIC PUMPS

Aldrich Pump Co. Vertical Triple HYDRAULIC PUMPS, 2¾" x 8", equipped with Herringbone Gears, 67.5 gpm. Maximum pressure for intermittent duty 2,200 lbs., for continuous duty 1,800 lbs. Pump and motor mounted on common bed plate. Motors are 75 HP, 3/60/220-400 volts, 740 RPM. Complete with starting panel, consisting of G.E. motorstarter switch, push button control, square "D" Switch, and Capacitator.
Purchased new 3½ years ago. Excellent condition. Available for immediate delivery. Reply Box C268, Modern Plastics.

FOR SALE: One French Oil Mill Hydraulic Press, 14" ram, 3" push-back rams, 24" x 18" platen, 8" stroke. One Baldwin South Works Hydraulic Press, 12" ram, 3½" push-back rams, 20" x 20" platen. One Reciprocating Type Preformer with individual drive. Make offer. Reply Box C423, Modern Plastics.

DO YOU NEED a Hydraulic Press for Compression Molding, Transfer Molding, Laminating, Forming, Bending, and Hobbing? Many sizes hydraulic presses and pumping units available. New motors from 2 to 7½ H.P., 220 volts, 3 phase. Whatever it may be, if it is hydraulic, see Sal-Press Company, 388 Warren Street, Brooklyn, N. Y.

WANTED: INDUSTRIAL ENTERPRISE. Large financially powerful diversified organization wishes to add another enterprise to present holdings. Cash paid for capital stock or assets. Existing personnel normally retained Strictly confidential. Box 1230, 1474 Broadway, N. Y. C.

WANTED: PLASTIC SCRAP OR REJECTS in any form. Cellulose Acetate, Butyrate, Polystyrene, Acrylic, Vinyl Resin, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding and magnetising. Reply Box 318, Modern Plastics.

FOR SALE—1—Watson Stillman Hydro-Pneumatic High and Low Pressure System, complete with pumps, tanks, boilers, etc., for 3000# operation. 2—Baker Perkins 100 gallon Plastic Mixers. 1—12" x 12" Press 7" Ram. Steel Heated Platens and Hand Pump attached; 1—24" x 24" Adamson, 10" ram, 2-opening Hydraulic Press; 1—24" x 24" Farrell, 10" ram, 2-opening Hydraulic Press; 1—30" x 30" D&B, 2-open, steel heated Platens 12" ram; 2—La Pointe Hydraulic Pumps, 150 G.P.M.—2000 lb. pressure direct motor driven to 125 HP AC motors; 1—French Oil Hydropneumatic Accumulator; 1—14" x 24" Press, 9" ram; 6—Hydraulic Presses, 20" x 20", 12" x 14"; Dry Powder Mixers; Pulverizers, Grinders, etc. Send for complete list. Reply Box 1545, Modern Plastics.

FOR SALE: Hydraulic Presses; 32" x 50", 24" ram, 700 ton, 21" x 24", 20" ram, 500 ton, 36" x 52", 14" ram, 385 ton, 36" x 36", 16" ram, 200 ton, 26" x 30", 15" ram, 177 ton, 13" x 19", 12" ram, 100 ton, 19" x 24", 10" ram, 78 ton, 23" x 17", 8" ram, 75 ton, 15" x 15", 8" ram, 75 ton, 12" x 12", 7½" ram, 50 ton, 12" x 13", 6½" ram, 42 ton, 8" x 9½", 4½" ram, 20 ton, 16" x 16", 3½" ram, 12 ton; Pumps: New Dual Rotary Pumping Units; HPM Triplex 1½ GPM 2500#; Robertson Duplex 1½ GPM 4000#; Worthington Triplex 12 GPM 2500#; Gould Triplex 12 GPM 1250# Worthington 2½ GPM 4000#; 4 plunger 6 GPM 2000#; Watson Stillman Duplex 1 GPM 2500#; Laboratory Mill 7" x 14"; Extruder, No. 3 Royle Perfected, m. d.; National Rubber Mchy. 2½" Plastic Unit, m. d.; W&P unjacketed sigma blade mixer, 100 gal. cap., Laboratory Presses, Hydro-Pneumatic and weighted type accumulators, q. o. door vulcanizers, etc. HIGHEST PRICES PAID FOR YOUR USED EQUIPMENT. Universal Hydraulic Machinery Company, 285 Hudson Street, New York City 13.

MODELS WANTED

Turn your old, discarded or outmoded molds into cash. Send sample and give full details in your letter. Reply Box C418, Modern Plastics.

WANTED: 4 oz. Injection Molding Machine. Kindly give price and description in your first letter. Reply Box C419, Modern Plastics.

PLASTIC PLANT FOR IMMEDIATE SALE—Modern injection molding plant established in middle-west area. All new equipment, including tool room. Plant layout perfectly designed, with room for expansion. Outstanding contracts and numerous molds already built. Valuation of business approximately $100,000.00. Reply Box C420, Modern Plastics.

FOR IMMEDIATE SALE—12-ounce Lester Injection Molding machine, 500 hours total operation, new price $16,400.00, will sell for 80% of the original cost. Reply Box C421, Modern Plastics.

WANTED: Good Used Injection Molding Machine. Capacity 22 oz. or larger. Reply stating price, make, model, age of machine and hours of operation. Reply Box C422, Modern Plastics.

FOR SALE: Angle Molding Hydraulic Press Watson-Stillman, suitable for Split Molds and for Molding Complicated Parts by the transfer method. 3 horizontal double acting rams, 13½", 8" and 6" arranged in "T". Reply Box C132, Modern Plastics.

WANTED-TO BUY: Plastic Molding Plant, Injection or Compression, or both. Give full details. Reply Box C424, Modern Plastics.

AVAILABLE. Executive with extensive experience in the mfg. of plastic materials; expert in coloring and designing; desires position as superintendent or the like, where qualifications will be utilized; has been associated with plastic industry for 30 years; has 20 years' supervisory experience in executive positions. Address Box C425, Modern Plastics.

SALES ENGINEER

A small progressive molding plant located in New Jersey desires services of a sales engineer who has working knowledge of compression molding, contacts in the field and ability to promote sales. State all qualifications and experience. Replies will be held strictly confidential. Reply Box C426, Modern Plastics.

Sales representatives wanted by eastern injection molding plant, specializing in difficult close tolerance jobs, with reputation for moldings or highest quality. Quick deliveries and excellent engineering and designing services available. Good commissions. Reply Box C430, Modern Plastics.

For Sale: One Taber Thermobead Duplex. This double edge beading machine is like new. Reply Box C427, Modern Plastics.

For Sale: 1 Acroil Plast-O-Dip Tank, Capacity 3 Gals, 110 Volt Built-in Dial Thermometer, Thermostatic control. Excellent working condition, very little used. $100.00. Reply Box C428, Modern Plastics.

PLANT OR PRODUCTION MANAGER—Experienced in all phases of production, design, cost, estimating, controls and maintenance in transfer, compression and injection molding. Familiar with accumulator and self contained operation. Seeks position with custom or proprietary molder. Capable of setting up molding plan. Age: 30. Location anywhere in the United States. Reply Box C429, Modern Plastics. Your prompt attention in this matter will be greatly appreciated.

Manufacturer with injection, compression, and electronic plunger molding and modern tool and die shop facilities wants representative for all industries. Contact Mutual Metal & Plastic Corp., 671 Bergen St., Brooklyn, N. Y.

FOR SALE

Hydro Pneumatic Accumulator, 13 Gal. 3500#. 25 Ton "C" Frame Type. High Speed Self Contained Hyd. Press—300 ton New Hobbing Press with Pump—Racine Pumps, Boosters, Valves, Logan Pumps, Valves. Self Contained.—200 H.P. 78 Gal. 3000# Pump. 200 H.P. 200 Gal. 1500# Pump, 18" x 15' Accumulator 1500#.—15" x 11' Acc. 400-2000#. 6" x 9' Accumulator-2000#. 300 Ton Press 20" Ram, 8" Stroke, 24" x 20" Platen. 500 Ton—1000 Ton Hobbing Press.—Hele Shaw Variable Pressure 33 GPM 2500#.—Vickers Oil Pumps 17 GPM 500 to 1000#. Elmes Horo. 4 Plunger 6½ Gals. 5000#.—Stillman 12" x 12" Laboratory Presses. Aaron Machinery Co., 45 Crosby St., NYC.

NEW ENGLAND Sales Organization wants lines. Organized 1935 and selling leading manufacturers in territory. One man in northern New England and one in southern part give complete and frequent coverage. Following products would dovetail with present line and both men have had experience with them: Molded and fabricated plastics, Die castings, Springs and stampings. Reply Box C431, Modern Plastics.

HYDRAULIC SERVICING

Hydraulic installations—repairs—modifications and hydraulic power units built to specifications by hydraulic specialists.
Hydraulic Service Co. of New York
4317 Richardson Ave., Bronx 66, N. Y.

Resin Chemist Wanted—Man well experienced in production and development of Phenolic Resins mainly for the protective coatings field (oilsoluble resins), industrial phenolics (brake linings, tin coatings). State fully previous experience, age and salary desired. Good opportunity for the right man, to work for progressive well founded company in New York State. Reply Box C432, Modern Plastics.

MOLDS FOR SALE

Compression Domino Mold—Double six & double nine sets. Compression Poker Chip Mold—64 cavity—1³/₁₆" chips. Compression Mold—126 cavity for ⅞" poker chips. Compression Mold—For Boxes to hold ⅞" poker chips. Compression Molds—For 8" and 10" Roulette wheels. Injection Mold—For 2³/₁₆" king size chessmen. Reply Box C433, Modern Plastics.

WANTED
PLASTIC INJECTION MOLDS

We will pay good prices for your obsolete tools. Telephone or write: Osgood Plastics, 208 E. 23 St., NYC. LE 2-2247.

FOR SALE

25-Stokes Preform Presses "R", 2½"; "T", 1½"; DD2 Rotary 13/16"; RD4 Rotary, 1"; Colton Rotary 35 Punch ¾"; 3- Baker Perkins, 100 gal. Jacketed Double Arm Mixers; Day Readco from 4 to 30 gal. Double Arm Mixers; 2- Ball & Jewell #0 & #1 Rotary Cutters. BRILL EQUIPMENT COMPANY, 225 West 34th St., New York, New York.

Experienced Sales Engineer to represent established Mid-West Injection and Extrusion Molder. Must have background in plastics. Write stating full qualifications, references, and territory desired. Reply Box C434, Modern Plastics.

FOR SALE

Hydraulic Pump, Aldrich 2 x 7 Vertical Triplex. Complete—2000 p.s.i. pressure. Immediate delivery.
Union Boiler and Manufacturing Co., Lebanon, Pennsylvania.

MATERIAL FOR SALE

300,000 lbs. phenolic resin impregnated paper—50% resin content. Reply Box C435, Modern Plastics.

For Sale, small Plastic Fabricating Plant, 1800 sq. ft. Low Rent, Down Town, N. Y. Tumbler, Unisaws, Bandsaw, Sander, 2 and 5 HP Buffers, Lathe, Drillpresses, Carvers, Shaper, Lots of Accessories and accounts. No Dealers. Reply Box C436, Modern Plastics.

For Sale: Brand new, 1 ounce injecting midget molder (Van Dorn). Less than the factory price. Paramount Calendar Co., 1260 West 4th Street, Cleveland 13, Ohio.

PLASTIC SHEETING SALESMAN

Large sheet manufacturer has unusual opportunity for experienced man to handle sales of cellulose acetate rigid sheet. This is permanent position and the right man will advance rapidly with progressive manufacturer. Headquarters Massachusetts. Reply Box C437, Modern Plastics.

J. S. HICKS, Ph.D., Consulting Engineer on Low Pressure Plastics; for development or production problems; formerly Technical Coordinator, Plastics Division, Owens Corning Fiberglas Corp. Address: 3455 Glynn Drive, Toledo 9, Ohio. Telephone: Walbridge 5231.

Wanted—Production Manager. Concern located western part of Wisconsin. Fabrication and lamination of plastic flexible and rigid sheeting. Building plant for manufacture of patented industrial packaging items. Top salary offer, plus liberal bonus plan. Ideal opportunity for man interested in substantial growth possibilities. Please state experience, present capacity and salary. Held strictly confidential. Reply Box C438, Modern Plastics.

WANTED: One injection molding machine of 4, 6 or 8 oz. capacity in excellent condition and early delivery. Reply Box C439, Modern Plastics.

FOR SALE—"Stabelan A" Vinyl Resin and Acrylonitrile Rubber Light Stabilizer, packed in original containers. Price 50¢ per lb. delivered. Reply Box C441, Modern Plastics.

New York representation for injection moulded line of buttons, jewelry findings, and ornaments wanted by established commission sales agency with centrally located office and experienced personnel. Well known in all novelty manufacturing and jobbing trades in locality. If you have ample production and wish substantial business from New York area contact—Seale-Gold Co., 10 W. 33 St., New York 1, N. Y. Phone PE 6-2590.

Wanted—Chemist or Chemical Engineer for color matching and color control work on thermoplastic type resins. Must have training or experience in color work. Position is permanent and offers excellent opportunities for advancement.
Plant located 30 miles from New York City. Write to our Personnel Department giving details, background, and salary expected.
BAKELITE CORPORATION
Unit of Union Carbide and Carbon Corporation
River Road Bound Brook, N. J.

INJECTION MOLDING ROOM FOREMAN

Knowledge of all phases of injection molding and die design. With progressive Eastern manufacturer. Give details of experience. All replies held confidential. Reply Box C440, Modern Plastics.

To garment manufacturers or moulders who have injections machines; Will lease on royalty basis, extention garment hanger covered by patent Rights. Here's protection without competition. Frank Simon, 961 Eastern Parkway, Brooklyn, N. Y. Telephone: Pr. 2-1964.

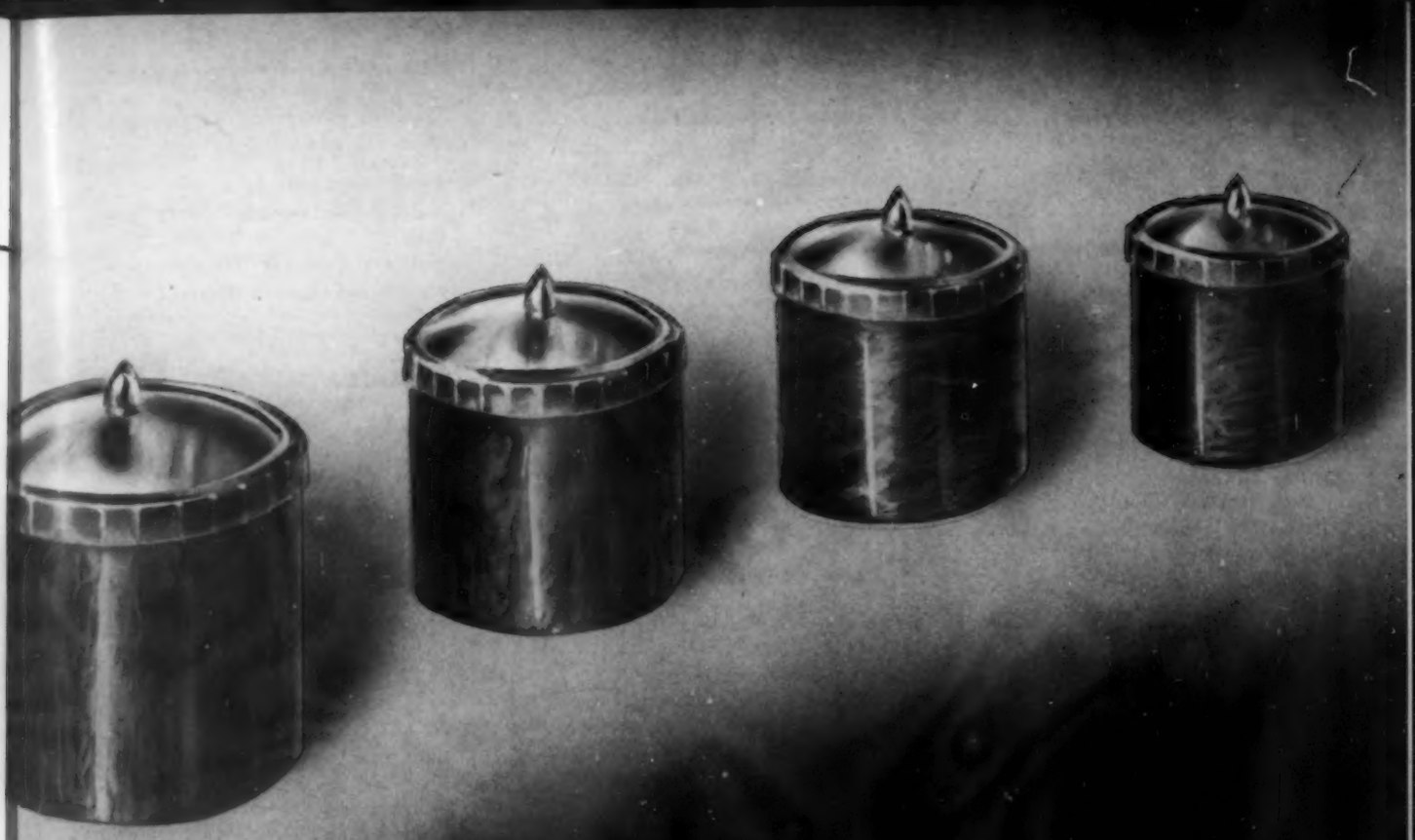
FOR SALE

(1) Brand new, size "00" Laboratory Banbury Mixer with Direct Current Motor. This machine is specially designed for high temperature work on thermoplastics, but is amply powered for rubber and has high pressure force feed lubrication system; hinged mixing chamber doors; jacketed for water or steam circulation. Mixing chamber and parts chrome plated. Leeds and Northrup recording potentiometer pyrometer included. Motor and controls are complete and consist of G-E 30 HP D.C. shunt wound gearhead motor, 450/1800 RPM; 50/200 RPM output speed, with all necessary switch gear and control equipment. An opportunity to obtain immediate delivery on brand new equipment at a cost below current market prices. Textileather Corporation, Toledo, Ohio.

MODERN PLASTICS ADVERTISERS

SEPTEMBER 1947

(Please turn to page 230)



The above canister set, molded for the Ross-Frederick Corp., is typical of quality molding by Arnold Brilhart Ltd. The size of this set and the material used presented unusual molding problems.

If you have had trouble in the past, in securing quality workmanship at a reasonable price, please contact Arnold Brilhart Ltd,

For your tough plastics problems

in compression, injection, transfer molding and precision machining

ARNOLD

Brilhart

LTD.

Box 31 • Mineola • New York

(Please turn to page 232)

A BRESKIN PUBLICATION

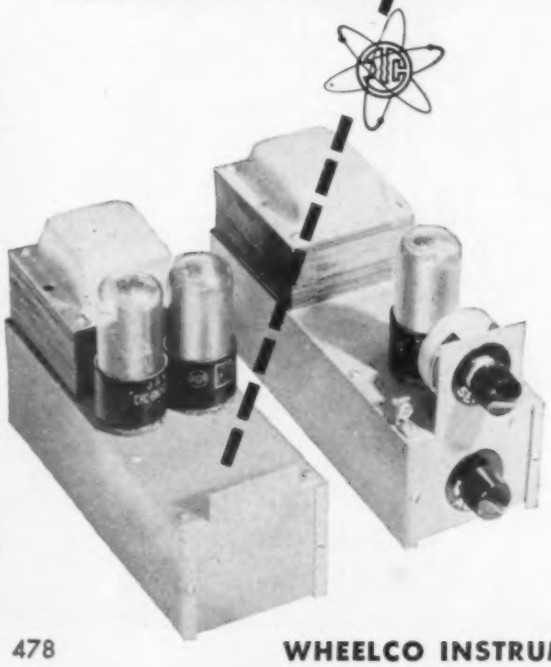
MODERN PLASTICS

Published by MODERN PLASTICS, INC.
122 East 42nd Street New York 17, N. Y.

Announcing

Wheelco CAPACILOG

A NEW *Electronic* SCRIBER



Wheelco, in creating the *"ELECTRONIC PRINCIPLE"* for pyrometric Control paved the way for faster, simpler and more accurate industrial Process Regulation.

Years of research, engineering and experience in practical application of Electronic Controls all over the world, now culminate in the production of the WHEELCO CAPACILOG, an electronic recording indicating or controlling instrument.

This simplified "ELECTRONIC SCRIBER" combines the "no-contact" features of the universally accepted Wheelco Capacitrol with a revolutionary mechanical design of rugged construction, perfected to fine watchmakers' precision.

The CAPACILOG is available as a *Deflection, Potentiometer* or *Resistance Thermometer Type Recorder, Recording Controller* or *Indicating Controller.*

CAPACILOG FEATURES

- **Wheelco "Electronic Principle"**
- **Direct Reading**
- **No Converters—No Relays**
- **Plug-In Chassis Design**
- **Multi-Tube Safety Factor**
- **Voltage Selector Plug**
- **Swing-Out Chart**
- **Automatic Chart Reroll**
- **Backlash Breaker**
- **Standard Electronic Tubes**

478 **WHEELCO INSTRUMENTS COMPANY** • **875 W. Harrison St., Chicago 7, Ill.**

WHEELCO *Electronic* INSTRUMENTS

Recorders · Controllers · Combustion Safeguards

Visit the Wheelco Booth: "INSTRUMENTS FOR TOMORROW" CHICAGO, SEPT. 8—12th • "NATIONAL METAL SHOW" CHICAGO, OCT. 18—24th

Courtesy of
Cambridge Industries, Inc.

THERE MAY BE A SUGGESTION FOR YOU IN THIS MOTHER'S DREAM COME TRUE

Making light of a tough, heavy job is a common enough experience at Worcester Moulded. The three piece King Cole Infant Trainer, an intricate designing and giant size moulding assignment, amply proves the point. Cambridge Industries, Inc. of New York, for whom it was developed, calls it "A masterpiece in beauty and utility combined" — a fixture in perfect harmony with modern bathroom fittings — a mother's dream come true. Here again was a big problem in plastics, but not too imaginative for the varied talents of our expert designers, die makers and engineers. Rather than WONDER how much our volume custom injection moulding facilities may benefit a product of yours, ASK us instead.

Custom Injection Moulding

WORCESTER MOULDED PLASTICS CO.

14 HYGEIA STREET, WORCESTER 8, MASS.

17 East 42nd St., New York 17, N. Y.
130 West Chippewa St., Buffalo 2, N. Y.

There's a pot of sales appeal at the end of this rainbow!

IT'S WAITING THERE for the manufacturers who buy some 30,000 different products made of elastic or resilient materials. But it will take a big assist from *molders of plastics* to help them find it!

This is one vast market that has yet to be actively cultivated.

It's up to you—to show these manufacturers the great advantages inherent in VINYLITE Brand elastomeric molding material. It's up to you to show them how drab-looking products can be made to sparkle with eye-catching color... how products now "taken for granted" can be taken instead for a merchandising fling!... how products with dull, dirt-catching surfaces can be given high-gloss smoothness and beauty... how small, utilitarian parts can be made to harmonize with the whole... and at the same time, how these products can acquire long-wearing service characteristics impossible with older elastomeric materials.

Help them follow the rainbow and find the sales appeal they're looking for!

Demonstrate the advantages of VINYLITE Brand elastomeric plastics—highly resistant to abrasion, oils, greases, acids, alkalis—non-oxidizing—capable of *high-speed production* through injection molding—and consequently low in cost. Write Department CR-7 for up-to-the-minute information on VINYLITE elastomeric compounds for injection-molding or extrusion!

VINYLITE

TRADE—MARK

plastics

Elastic Molded Products in COLOR!

BAKELITE CORPORATION
Unit of Union Carbide and Carbon Corporation UCC
30 East 42nd Street, New York 17, N. Y.

• ENGINEERED AND MOLDED AT NO. 1 PLASTICS AVENUE

Ever see rubber like this?

• Here's an amazing kind of rubber! Bake it in an oven, immerse it in a dry ice bath, and it remains resilient and flexible. It's the new General Electric silicone rubber that withstands heat up to 520 F, cold down to —55 F.

Improved molding and fabricating techniques used by General Electric make possible a whole new field of applications for this remarkable silicone product. Used during the war for gaskets in high-heat searchlights and airplane superchargers, General Electric silicone rubber is now being applied extensively to electrical equipment of many types, heat-sealing apparatus, baking ovens, diesel engines and high-vacuum systems.

The successful application of this remarkable material to many industrial products grows out of General Electric's complete plastics service—equipped to design, engineer and mold all types of plastics to meet your individual requirements. For more information on silicones, or plastics, write Chemical Department, General Electric Company, Pittsfield, Mass.

G-E Complete Service—Everything in Plastics

BACKED BY 53 YEARS OF EXPERIENCE. We've been designing and manufacturing plastics products ever since 1894. G-E research works continually to develop new materials, new processes, new applications

NO. 1 PLASTICS AVENUE —complete plastics service—engineering, design and mold-making. Our own industrial designers and engineers, working together, create plastics parts that are both scientifically sound and good-looking. Our own toolrooms are manned by skilled craftsmen—average precision mold experience, 12 years.

ALL TYPES OF PLASTICS. Facilities for compression, injection, transfer and cold molding . . . for high and low pressure laminating . . . for fabricating. G-E Quality Control—a by-word in industry, means as many as 160 inspections and analyses for a single plastic part.

GENERAL ELECTRIC

CD47-487

EVERYTHING IN *Plastics*

GENERAL ELECTRIC PLASTICS FACTORIES ARE LOCATED AT SCRANTON, PA., MERIDEN, CONN., COSHOCTON, OHIO, FORT WAYNE, IND., TAUNTON AND PITTSFIELD, MASS.